Cold Elk Range Analysis

Biological Assessment

SR Steelhead & Critical Habitat

Wallowa Valley Ranger District
Hells Canyon NRA
Wallowa-Whitman National Forest

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A. INTRODUCTION:

The purpose of this Biological Assessment (BA) is to initiate consultation on two of the three allotments that make up the Cold Elk Range Analysis (CERA): Cold Springs Allotment and Teepee Elk Allotment. The third allotment, Lost Cow, does not have ESA-listed fish habitat present. The allotments are located on the Wallowa Valley Ranger District and Hells Canyon NRA of the Wallowa-Whitman National Forest and are managed by the Wallowa Mountains Office (WMO) located in Joseph, Oregon. Consultation is needed for the next 10 years to reauthorize livestock grazing on these allotments.

Purpose and Need

The Multiple-Use Sustained-Yield Act of 1960 states "It is the policy of Congress that the National Forests are established and shall be administered for outdoor recreation, range, timber, watershed, wildlife and fish purposes".

The Wallowa-Whitman NF Forest Plan (1990) states: "Range ecosystems are to be managed to ensure that the basic needs of the forage and soil resources are met. Forage production, above that needed for maintenance or improvement of the basic resources is to be made available to wildlife and permitted domestic livestock under the standards and guidelines that will assure continued maintenance or improvement of the resource."

Previous ESA Consultation

ESA consultation for the Teepee Elk and Cold Springs allotments previously occurred in 1998. Livestock grazing on both allotments was determined to may affect, not likely to adversely affect steelhead and their habitat.

Analysis Area

The Cold Elk Range Analysis area is located approximately 48 miles north of Enterprise, Oregon and encompasses 38,800 acres of National Forest System lands. The analysis area for the CERA includes three allotments: Lost Cow, Cold Springs, and Teepee-Elk allotments. These allotments are generally located in Township 6 North, Range 47 East; Township 5N, Ranges 46 and 47 East; and Township 4 North, Ranges 46 and 47 East (Willamette Meridian). See Figure 1 for a map of the locations of the three allotments.

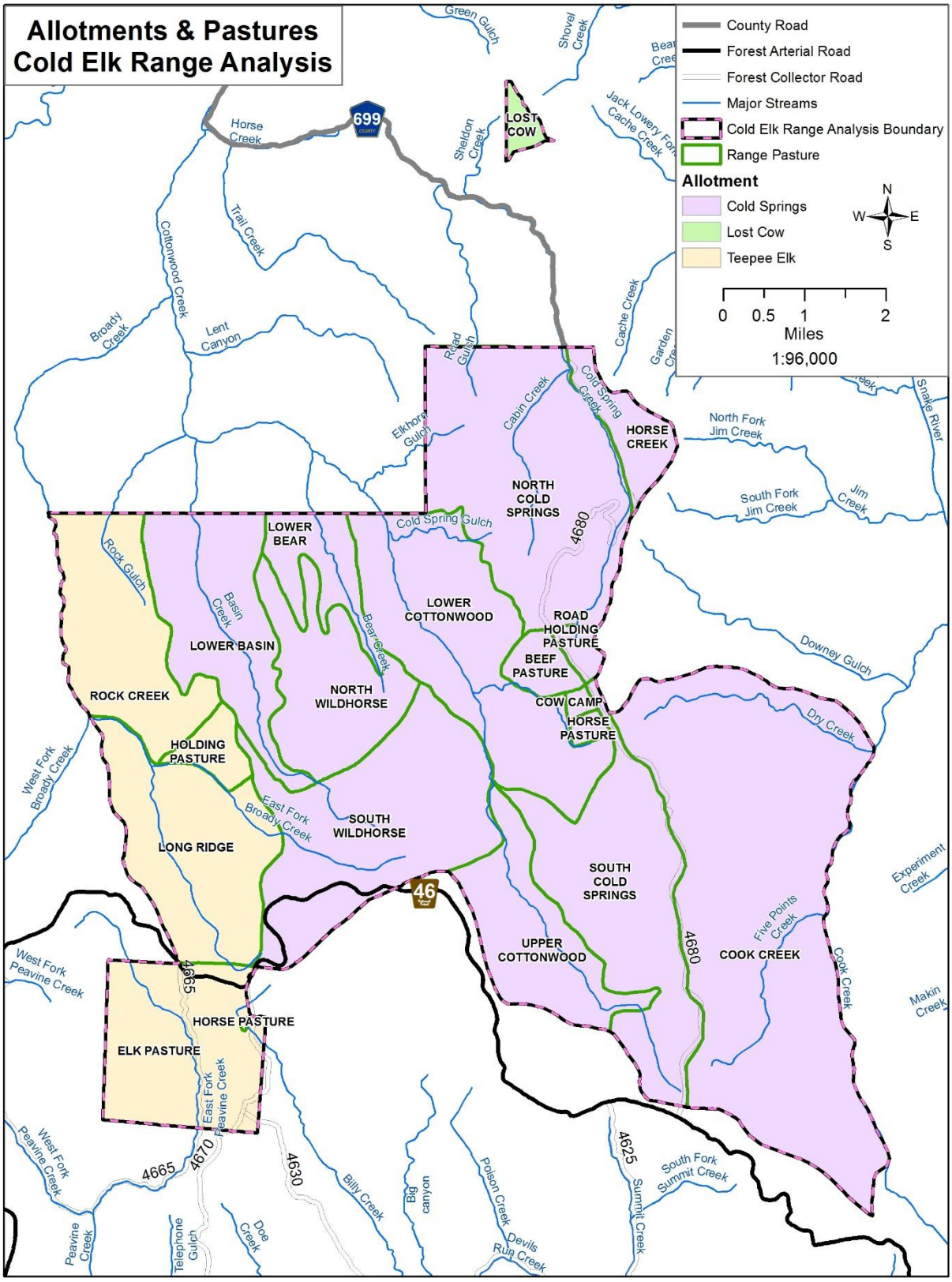

Figure 1. Analysis area and allotment locations for the Cold Elk Range Analysis

The analysis area is located in five subwatersheds in the Lower Joseph Creek Watershed (HUC 1706010606), one subwatershed in the Snake River-Cherry Creek WS (HUC 1706010301), and two subwatersheds in the Chesnimnus Creek WS (HUC 1706010604, Table 1).

Table 1. Location of allotments in the Cold Elk Range Analysis by subwatershed.

Subwatershed	SWS Code	Allotment		
		Cold Springs	Lost Cow	Teepee Elk
Lower Cottonwood Creek	170601060606	X		X
Broady Creek	170601060604	X		X
Peavine Creek	170601060407			X
Middle Chesnimnus Creek	170601060403	X		X
Upper Cottonwood Creek	170601060603	X		
Horse Creek	170601060605	X		
Cook Creek	170601030102	X		
Horse Creek	170601060605		X	
Snake River-Corral Creek	170601030105		X	

ESA-listed Fish Species in Analysis Area

Snake River (SR) steelhead (Threatened) is the only ESA-listed fish species are present in the analysis area (Table 2). SR steelhead and their habitat are present on the Cold Springs and Teepee Elk allotments.

Table 2. Species and critical habitat present in the analysis area for the Cold Elk Range Analysis.

ESA-listed Fish Species, Critical Habitat & Essential Habitat	Allotment		
	Cold Springs	Lost Cow	Teepee Elk
SR Steelhead	Present	Not Present	Present
SR Steelhead Critical Habitat	Present	Not Present	Present

B. PACFISH DIRECTION FOR LIVESTOCK GRAZING

The Forest Plan was amended in 1995 by the Pacific Anadromous Fish Strategy (PACFISH) amendment that supplemented existing management direction and standards in the Forest Plan by replacing direction that provided less protection for aquatic habitat. The PACFISH amendment did not replace existing Forest Plan direction where the Forest Plan provided more protection for aquatic habitat.

PACFISH contains three components directly relate to livestock grazing on National Forest System lands: 1) riparian goals, 2) riparian management objectives, and 3) standard and guidelines. These components of PACFISH are interrelated and hierarchical.

> Riparian Goals: Riparian goals establish a common set of the characteristics of healthy functioning watersheds, riparian areas, and associated fish habitats. (PACFISH EA p 16).

Riparian Management Objectives: RMOs establish a common number of stream and streamside habitat conditions that together define good anadromous fish habitat at the landscape scale, and serve as indicators against which attainment, or progress toward attainment, of goals can be measured. (PACFISH EA p. 16).

Standards and Guidelines: Standards and guidelines constrain how riparian and other important areas (such as landslides and landslide prone areas) are managed. They provide management direction believed necessary to meet Riparian Goals and RMOs for stream, riparian, and watershed conditions. (PACFISH EA p. 16).

By adhering to PACFISH standards and guidelines, stream and streamside habitat conditions should progress to attainment of RMOs and the riparian goals of PACFISH (PACFISH EA p. 16).

PACFISH contains four standards and guidelines specific for livestock grazing activities:

- **GM-1** - Modify grazing practices (e.g. accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives (RMOs) or are likely to adversely affect listed anadromous fish. Suspend grazing if adjusting practices is not effective in meeting RMOs and avoiding adverse effects on listed anadromous fish.
- **GM-2** - Locate new livestock handling and/or management facilities outside of Riparian Habitat Conservation Areas (RHCAs). For existing livestock handling facilities inside the RHCAs, assure that facilities do not prevent attainment of RMOs or adversely affect listed anadromous fish. Relocate or close facilities where these objectives cannot be met.
- **GM-3** - Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that would not retard or prevent attainment of RMOs or adversely affect listed anadromous fish.
- **GM-4** - Adjust wild horse and burro management to avoid impacts that prevent attainment of RMOs or adversely affect listed anadromous fish.

Under PACFISH, "retard" means to slow the rate of recovery below the near natural rate of recovery if no additional human caused disturbance was place on the system. Degradation of physical/biological processes or conditions that determine RMO features is also considered to retard the attainment of RMOs.

PACFISH grazing guidelines (Enclosure B: Recommended Livestock Grazing Guidelines Rev. 7/31/95; "Enclosure B") state that the "Influences of grazing must result in riparian restoration at a minimum of near natural rates." This same reference, page 7, describes achieving a "near natural rate of recovery", in general, as avoiding effects that "carry over to the next year" so as to prevent the likelihood of cumulative, negative effects. Key assumptions and guidelines from Enclosure B are:

- Influences of livestock grazing must result in riparian restoration at a minimum of "near natural" rates. There are some environmental effects that are inherent with the presence of livestock. However, "near natural" rates of recovery can be provided if environmental effects are limited to those <u>that do not carry through to the next year</u>, thereby avoiding cumulative, negative effects. It is assumed that this can occur if:
  - Condition thresholds are not exceeded;
  - Standards and guidelines for forage and browse utilization are not exceeded;
- Adverse effects to aquatic habitat associated with livestock grazing can be avoided and riparian restoration provided by controlling:

- Season of use (tied to plant phenology and soil characteristics rather than calendar dates) and
- Amount of use.

- Providing for the health, form and function of riparian systems should remain the focus of grazing management efforts.
- Stream gradient, inherent stability characteristics, potential vegetative communities, and type of degradation (i.e., vegetation vs. bank/channel characteristics) are important factors in determining restoration potential and guidelines that will lead to restoration.
- Guidelines for developing allotment specific prescriptions can be identified at the programmatic level. However, in general, the prescriptions themselves must be developed to fit "on-the-ground" conditions within the context of those guidelines.
- In some definable cases, avoiding adverse effects can only be accomplished by suspending livestock grazing. These cases include problems related to ecological status (i.e. predominance of early seral vegetation along streambanks)
- Effective monitoring using specific measurement approaches, as well as administration are essential.

Livestock grazing has inherent effects to riparian/aquatic ecosystems. These effects include grazing and browsing effects to vegetation and impacts to soils and streambanks from hoof action. Recognizing these effects, Enclosure B estimated that by reducing the level of effects that carry through to the following year to an acceptable level that livestock grazing would achieve an estimated rate of recovery of 70% of the near natural rate of recovery without the presence of livestock.

In response to Enclosure B, the WWNF developed condition thresholds for utilization (Enclosure: PACFISH/INFISH W-W Interpretations Pertaining to Livestock Management Activities [dated May 1996]; Table 3). Where PFC assessments concluded that a riparian/stream system is rated as Not Functioning or Functioning at Risk with a downward trend and livestock activity is a significant factor for the rating then resting the pasture or excluding livestock should be considered. Where PFC assessments concluded that a riparian/stream system is rated Not Functioning or Functioning at Risk with a downward trend and livestock activity ***is not*** a significant factor for the rating then the Function at Risk condition thresholds should be used.

Table 3. WWNF condition thresholds for greenline utilization.

Riparian Condition (Based on PFC Assessment)	Riparian			
	Grass and Grass-like (Greenline)	Sedge and Rush (Sinks)	Kentucky Bluegrass / Mixed Species (Terraces)	Woody Vegetation
Proper Functioning Condition	4 inches	3 inches	2 inches	30%
Functioning at Risk (Static or upward trend)	6 inches	4 inches	4 inches	30%

By meeting WWNF condition thresholds, livestock grazing activities are considered to be consistent with PACFISH GM-1, and thus allowing for the attainment of PACFISH RMOs and riparian goals through natural recovery processes. Since the issuance of PACFISH Enclosure B an additional condition threshold for streambank alteration has been developed to limit the effects of livestock grazing on riparian areas and to ensure that grazing activities are consistent with GM-1 and allow for the attainment of RMOs and riparian goals of PACFISH.

The WMO also uses a suite of additional grazing related indicators to determine if attainment of PACFISH riparian goals is occurring. Unlike PACFISH RMOs, these additional indicators can be directly affected by livestock grazing and provide a more sensitive measure of past and current effects of livestock grazing on riparian areas. These indicators include: 1) condition of riparian vegetation and stream channels with regards to functionality (see PFC Assessment discussion below), and 2) greenline composition (greenline ecological status rating, site wetland rating, greenline stability rating; see MIMs discussion below).

C. EXISTING CONDITION

The existing condition analysis for stream and riparian habitats on the CERA allotments are based on: 1) available data from stream surveys, Properly Functioning Condition (PFC) assessments, and Multiple Indicator Monitoring (MIM), 2) observations during site visits, and 3) professional judgment. These sources of information are used collectively to access the current condition of the allotments and the level of effects from current grazing activities on aquatic habitat and to determine if a near natural rate of recovery is being achieved, and allowance for the attainment of PACFISH RMOs and riparian goals through natural recovery processes.

Proper Functioning Condition Assessment (PFC)

Cold Springs Allotment

Two PFC assessments were conducted on Cottonwood Creek within the Cold Springs Allotment in 2017. PFC assessments were conducted on lower Cottonwood Creek and upper Cottonwood Creek. See Appendix C for the location of PFC assessments. Cottonwood Creek is a Rosgen B4 channel type. Streambanks are composed of cobble stabilized by riparian shrubs and thus are resistant to damage from livestock. Cottonwood Creek is fairly uniform regarding channel dimensions and profile in the Cold Springs Allotment. Cottonwood Creek becomes intermittent most years between Deadhorse Creek and the Forest Boundary. Lower Cottonwood Creek was rated as FAR during the 2017 assessment. A large debris flow event occurred in the spring of 2017 prior to the PFC assessment. Riparian areas were damaged, the channel incised up to 4 feet in places, and a large amount of LWD was flushed from the active channel area.

Based on the observations during the 2017 PFC assessment, upper Cottonwood Creek was rated at PFC for vegetation indicators, PNC for hydrology and erosion/deposition indicators, and PFC overall (Table 4). Grazing impacts to the riparian shrub community were minimal; however, the riparian community is still recovering from the 1988 Teepee Butte Fire.

Table 4 Summary of properly functioning condition assessments for the Cold Elk Range Analysis.

Allotment	Stream	Year	Hydrology	Vegetation	Erosion/ Deposition	Overall Rating
Cold Springs	Cottonwood Creek (Lower)	2017	FAR	PFC	FAR	FAR
Cold Springs	Cottonwood Creek (Upper)	2017	PNC	PFC	PNC	PFC

NF = Nonfunctional, FAR = Functioning at Risk, PFC = Properly functioning condition. PNV = Potential natural vegetation, PNC = Potential Natural Condition

Teepee Elk Allotment

PFC assessments have not occurred recently on the Teepee Elk Allotment. In 2009 a PFC assessment occurred on Broady Creek in the Teepee Elk Allotment as part of the data collection effort for the Lower Joe Watershed Assessment. Broady Creek was rated PFC with few impacts from grazing noted.

Multiple Indicator Monitoring (MIM)

Cold Springs Allotment

Three Designated Monitoring Areas (DMAs) have been established on the Cold Springs Allotment; two on Cottonwood Creek and one on Horse Creek. See Appendix C for the location of DMAs.

Effectiveness monitoring also show that objectives for long-term indicators are being met or exceed for most of the long-term indicators on Cottonwood Creek at both the upper and lower DMAs (Tables 5, 6). The results of the MIM are consistent with results of the 2017 PFC assessments with regards to riparian vegetation and channel conditions. The MIM data and PFC assessment indicate that Cottonwood Creek riparian areas at both the upper and lower DMAs are meeting most objectives for aquatic and riparian habitat. The Cottonwood Creek DMAs are located on reaches of Cottonwood Creek with perennial flow. The shade index at both DMAs is lower than desired reflecting the impacts from the 1988 Teepee Butte Fire.

Table 5. Summary of MIM at the Lower Cottonwood DMA, Cold Springs Allotment.

Indicator	2016	Objective	Trend	Comments
Average SH for all key species (in)	--	≥6		Not sampled
Woody Species Use (%)	--	≤35		Not sampled
Streambank Alteration (%)	--	≤20		Not sampled
Streambank Stability (%)	99	≥90	NAT	Meets objective
Streambank Cover (%)	99	≥90	NAT	Meets objective
Fine Sediment (%)	2	<20	NAT	Meets objective
Greenline Ecological Status Rating	79±5.8 (Late)	>61 (Late)	NAT	Meets objective
Site Wetland Rating	61±3 (FAC+)	≥67 (FACW-)	NAT	Does not meet objective
Winward Greenline Stability Rating	6.26±0.16 (High)	>6 (High)	NAT	Meets objective
Shade Index	0.23 (Very Low)	≥3 (High)	NAT	Does not meet objective
		Overall Trend	NAT	Meeting most objectives

Trend: NAT=No Apparent Trend

Table 6. Summary of MIM at the Upper Cottonwood DMA, Cold Springs Allotment.

Indicator	2016	Objective	Trend	Comments
Average SH for all key species (in)	--	≥6		Not sampled
Woody Species Use (%)	--	≤35		Not sampled
Streambank Alteration (%)	--	≤20		Not sampled
Streambank Stability (%)	99	≥90	NAT	Meets objective
Streambank Cover (%)	99	≥90	NAT	Meets objective
Fine Sediment (%)	18	<20	NAT	Meets objective
Greenline Ecological Status Rating	84±5.8 (Late)	>61 (Late)	NAT	Meets objective
Site Wetland Rating	65±3 (FAC+)	≥67 (FACW-)	NAT	Does not meet objective
Winward Greenline Stability Rating	5.39±0.16 (Mid)	>6 (High)	NAT	Does not meet objective
Shade Index	0.1 (Very Low)	≥3 (High)	NAT	Does not meet objective
		Overall Trend	NAT	Meeting most objectives

Trend: NAT=No Apparent Trend

The Horse Creek DMA is located on a nonfish-bearing reach of Horse Creek with intermittent flow. The natural capability of this site is lower than at a perennial site due to the lack of water availability during summer and early fall. Streambank stability is meeting the objective while the other three indicators are lower than desired (Table 7). Based on the limited evidence of cattle use at this site the current conditions are unlikely to be the result of excessive livestock use. This DMA will not be monitored in the future.

Table 7. Summary of MIM at the Horse Creek DMA, Cold Springs Allotment.

Indicator	2016	Objective	Trend	Comments
Average SH for all key species (in)	--	≥6		Not sampled
Woody Species Use (%)	--	≤35		Not sampled
Streambank Alteration (%)	--	≤20		Not sampled
Streambank Stability (%)	91	≥90	NAT	Meets objective
Streambank Cover (%)	87	≥90	NAT	Does not meet objective
Fine Sediment (%)	21	<20	NAT	Does not meet objective
Greenline Ecological Status Rating	60±5.8 (Mid)	>52 (Upper Mid)	NAT	Meets objective
Site Wetland Rating	40±3 (FACU+)	≥58 (FAC+)	NAT	Does not meet objective
Winward Greenline Stability Rating	4.95±0.16 (Mid)	>5.5 (Mid)	NAT	Does not meet objective
Shade Index	0.5 (Very Low)	≥2 (High)	NAT	Does not meet objective
		Overall Trend	NAT	Not meeting most objectives

Trend: NAT=No Apparent Trend

Teepee Elk Allotment

Two DMAs are located on the Teepee Elk Allotment. One is located on E.F. Peavine Creek and the other is located on Broady Creek.

The Broady DMA was established in 2010 for the Lower Joseph Creek Watershed Assessment and has been read twice for effectiveness indicators. The Broady DMA is located on a reach with intermittent flow within the Rock Creek pasture. Objectives for the DMA have been adjusted to reflect the intermittent flow of Broady Creek through the DMA (Table 8). Most metrics are similar between the

two years. However, the greenline ecological status at Broady site was rated as late seral in 2016 compared to mid-seral in 2010; indicating some improvement in conditions.

Table 8. Summary for MIM at the Broady Creek DMA, Teepee Elk Allotment.

Indicator	2010	2016	Objective	Trend	Comments
Average SH for all key species (in)	--	--	≥6		Not sampled
Woody Species Use (%)	--	--	≤35		Not sampled
Streambank Alteration (%)	--	--	≤20		Not sampled
Streambank Stability (%)	100	96	≥90	NAT	Meets objective
Streambank Cover (%)	100	100	≥90	NAT	Meets objective
Fine Sediment (%)	1	0	<20	NAT	Meets objective
Greenline Ecological Status Rating	55 ±5.8 (Mid)	66±5.8 (Late)	>52 (Upper Mid)	Positive	Improving, Meets objective
Site Wetland Rating	50 ±3 (FAC)	44±3 (FAC)	≥58 (FAC+)	Negative	Declining, Does not meet objective
Winward Greenline Stability Rating	5.50±0.16 (Mid)	5.57±0.16 (Mid)	>5.5 (Mid)	Positive	Improving, meets objective
Shade Index	0.49 (Very Low)	0.43 (Very Low)	≥2 (High)	Negative	No change, Does not meet objective
			Overall Trend	**NAT**	Meeting some objectives

Trend: NAT=No Apparent Trend

The E.F. Peavine DMA was established in 2016. The DMA is located on a reach with intermittent flow. Two of the effectiveness indicators are meeting objectives (greenline ecological status and wetland site ratings) while the streambank stability and greenline stability ratings are lower than desired (Table 9). There was a high level of livestock presence along E.F. Peavine Creek when visited in the fall of 2018.

Table 9. Summary for MIM at the E.F. Peavine Creek DMA, Teepee Elk Allotment.

Indicator	2016	Objective	Trend	Comments
Average SH for all key species (in)	--	≥6		Not sampled
Woody Species Use (%)	--	≤35		Not sampled
Streambank Alteration (%)	--	≤20		Not sampled
Streambank Stability (%)	84	≥90	NAT	Does not meet objective
Streambank Cover (%)	90	≥90	NAT	Meets objective
Fine Sediment (%)	46	>20	NAT	Does not meet objective
Greenline Ecological Status Rating	71±5.8 (Late)	>52 (Upper Mid)	NAT	Meets objective
Site Wetland Rating	66±3 (FAC+)	≥58 (FAC+)	NAT	Meets objective
Winward Greenline Stability Rating	4.05±0.16 (Mid)	>5.5 (Mid)	NAT	Does not meet objective
Shade Index	0.05 (Very Low)	≥2 (High)	NAT	Does not meet objective
		Overall Trend	NAT	Not meeting most objectives

Trend: NAT=No Apparent Trend

PIBO Effectiveness Monitoring DMA

PACFISH/INFISH Biological Opinion (PIBO) effectiveness monitoring occurred on lower Cottonwood Creek in 2004, 2009 and 2014. Cottonwood Creek was meeting PACFISH RMOs for streambank stability, percent fines, and LWD all years (Table 10). Cottonwood Creek was not meeting the RMO for pool frequency any year monitored (Table 10).

Table 10. PIBO effectiveness monitoring data for Cottonwood Creek, Cold Springs Allotment. Shading indicates RMO being met.

Stream	PIBO Site Name	Year	Pool Freq (#/km)	LWD Freq (pieces/km)	Percent Fines (< 6 mm)	Streambank Stability
Cottonwood Cr	136-13-I	2004	23.5	82.4	0.7	90.5
Cottonwood Cr	136-13-I	2009	18.8	200.0	4.7	97.5
Cottonwood Cr	136-13-I	2014	22.8	165.2	1.7	97.6

Stream Habitat Surveys

Stream surveys are conducted using the Region 6 Level II stream survey protocol. This protocol has been refined since its development in the late 1980's. A Level II survey is an extensive stream channel, riparian vegetation and aquatic habitat condition inventory at a watershed scale. This level is used to determine the condition of the streams during low flow conditions. Data from Level II surveys are used to compare existing stream conditions to riparian management objectives.

Forest Plan Riparian Management Objectives

Critical aquatic habitat elements as defined by the 1990 Forest Plan (including the 1995 PACFISH amendment), and the 1995/98 Forest Plan Biological Opinions (BOs) include: 1) pool frequency, 2) water temperature, 3) large woody debris, 4) bank stability, 5) width to depth ratio, and 6) fine sediment levels. These habitat elements are considered to be important indicators of aquatic habitat function and health.

RMOs were developed as part of PACFISH to provide criteria for managers to compare existing stream habitat conditions to criteria that constitutes "good habitat" for anadromous fish (PACFISH 1995). RMOs are defined by PACFISH as "Quantifiable measures of stream- and streamside conditions that define good anadromous fish habitat and serve as ***indicators*** [emphasis added] against which attainment, or progress toward attainment, of the goals will be measured." (PACFISH 1995). Default RMOs came from a review and synthesis of data from stream inventories and monitoring studies throughout the western United States where "high quality" habitat occurred (USDA/USDI 1995).

PACFISH RMOs are meant to apply to two broad-based ecosystems– forested and nonforested ecosystems at the landscape level (PACFISH 1995). The pool frequency RMO is considered a key feature and applies to both forested and nonforested systems. Supplemental features include: water temperature (all systems), large woody debris (forested systems), bank stability (nonforested systems), lower bank angle (nonforested systems), and width/depth ratio (all systems). In practice, differentiation between forested and non-forested systems is rarely observed and RMOs are applied to streams at the reach level.

The intent of RMOs was to provide benchmarks for evaluating the current conditions of streams and to initiate changes in management where management activities were preventing the attainment of RMOs. PACFISH states that RMOs must be met to consider anadromous habitat to be in good

condition. However, the utility of PACFISH/INFISH RMOs and other similar channel-based indicators have been questioned with regards to their sensitivity to management activities and for describing high quality fish habitat (Reid and Furniss, 1998; Kershner and Roper, 2010).

Additionally, PACFISH does not specify the methodology with which channel-based RMOs are measured. Natural variability in stream channel dimensions/characteristics through time, variability in monitoring methodologies, and variability in observers can result in wide differences in measurements of PACFISH RMOs (Whitacre et al., 2007, Al-Chokhachy et al., 2001).

The Lower Joseph Creek Watershed Assessment was completed in 2010 and covers much of the analysis area for the CERA. Watershed specific RMO values were not developed during the assessment process. PACFISH interim RMOs are shown in Tables 11 and 12.

Table 11. PACFISH Interim Riparian Management Objectives.

Habitat Feature	Interim Objectives
Pool Frequency (kf[1]) (all systems)	Varies by channel width (see Table 12)
Water Temperature (sf[2]) (all systems)	No measurable increase in maximum water temperature (7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period). Maximum water temperatures below 64°F within migration and rearing habitats and below 60°F within spawning habitats.
Large Woody Debris (sf) (forested systems)	Coastal California, Oregon and Washington: >80 pieces per mile; >24 inch diameter; >50foot length. East of Cascade Crest in Oregon, Washington, Idaho: >20 pieces per mile; >12 inch diameter, > 35 foot length
Bank Stability (sf) (non-forested systems)	>90 percent stable. (Note: the objective for streambank stability was increased from >80 as a result of ESA consultation.)
Lower Bank Angle (sf) (non-forested systems)	>75 percent of banks with <90 degree angle (i.e., undercut).
Width/Depth Ratio (sf) (all systems)	<10, mean wetted width divided by mean depth.

[1] Key feature; [2] Supporting feature

Table 12. Pool RMO based on Stream Wetted Width.

Wetted Width (feet)	10	20	25	50	75	100	125	150	200
Pools per mile	96	56	47	26	23	18	14	12	9

Summaries of stream surveys for streams in the CERA analysis area are shown in Table 13.

Table 13. Summary of stream surveys for the Cold Elk Range Analysis. N/D = No data.

Stream Name	Year of Stream Survey	Rosgen Type	Ave Wetted Width (ft)	Pools/Mile[1]	Pieces LWD/Mile	% Particles <6.3mm	W/D Ratio[2]	% Stable Banks
Cold Springs	2016	B4	1.8	0.0	0.0	24.0	14.7	95.6
Cottonwood Creek	1989	N/D	7.7	14.0	126.9	N/D	11.8	95.0
	1994	N/D	6.2	30.1	80.1	N/D	15.4	95.0
	2015	B3	6.6	57.7	9.9	8.0	21.1	98.5
Broady Creek	1989	N/D	9.4	16.7	116.0	N/D	7.3	N/D
	1992	N/D	6.5	23.2	92.5	N/D	9.8	N/D
	2015	B4	8.1	19.5	8.1	23.2	26.6	99.0
E.F. Broady Creek	1997	N/D	5.6	33.8	78.7	N/D	10.9	99.0
	2016	N/D	4.0	43.4	20.9	N/D	17.5	97.0
Horse Creek	2016	B4	7.1	5.6	0.3	19.8	16.1	97.4
E.F. Peavine Creek	1992	N/D	7.5	11.5	91.2	N/D	21.1	N/D
	2007	B/C	3.9	11.0	10.4	8.5	15.4	85.0
RMO/Indicator				See below	20	<20%	<10	>90

Note 1) See Table 12 for RMOs. 2) Normal ranges for width-to-depth ratios (bankfull width) for Rosgen channels are: A B and C channels are 12 to 20 and 13.5 to 28.7, respectively (Rosgen, 1996).

Cold Springs Allotment

Cottonwood Creek on the Cold Springs Allotment has been surveyed three times; 1989, 1994, and 2015 (Table 13). Cottonwood Creek is a perennial fish bearing stream with portions of interrupted surface flow by late summer. The 1989 survey occurred one year following the Teepee Butte Fire (1988) which was a stand replacement/high severity fire along the majority of Cottonwood Creek. The 2015 survey occurred during the historic drought year for the PNW and long portions of the stream were dry. Cottonwood Creek is as a Rosgen B channel type with a narrow floodplain and streambanks armored with cobble-sized substrate. Cottonwood Creek has not been impacted by road construction or logging activities on NFS lands. Cottonwood Creek does not meet most PACFISH RMOs, however, pool habitat has increased almost 4 times been from 1989 to 2015. LWD levels appear to have decreased during the same period however this is likely an artifact of changes in the survey protocol rather than an actual change in LWD. Since management activities have largely been absent along Cottonwood Creek, the current condition of habitat features is likely within the natural range of variability.

Horse Creek on the Cold Springs Allotment was surveyed in 2016. Horse Creek is an intermittent non-fish bearing stream on the Cold Springs Allotment. Downstream of the allotment it is a perennial fish bearing stream that provides spawning and rearing habitat for steelhead. Horse Creek has been impacted by road construction along most of its length.

Cold Springs Creek is a Category 4 tributary to Horse Creek. Majority of the stream was dry when it was surveyed in 2016. No pools or LWD were recorded during the stream survey.

Teepee Elk Allotment

The Teepee Elk Allotment contains portions of the following fish bearing streams: E.F. Peavine Creek, Broady Creek, and E.F. Broady Creek. Stream surveys have been completed on Broady Creek, E.F. Broady Creek and E.F. Peavine Creek (Table 13).

E.F. Peavine Creek is a tributary to Peavine Creek which flows into Chesnimnus Creek. It has been surveyed in 1992 and 20017. Pool habitat is relatively low and LWD has declined from 1992 to 2007.

Broady Creek is a tributary to Cottonwood Creek which flows into Joseph Creek. Broady Creek has been surveyed three times. Pool habitat is relatively low and LWD has declined since 1989.

E.F. Broady Creek is a tributary to Broady Creek. E.F. Broady Creek has been surveyed twice. Pool habitat has increased slightly while LWD have declined.

Stream Temperature Monitoring

Factors that determine stream temperatures include sunlight/solar radiation, air temperature, and streamflow. The amount of solar energy that reaches the surface of a stream is determined by many factors including the position of the sun in the sky, cloud cover, local topography, stream aspect, stream width, and streamside vegetation. Streams generally warm in a downstream direction as they become wider, resulting in streamside vegetation being less effective at shading the surface of the water, and air temperatures increase as elevation decreases. Also, the cooling influences of ground water inflow and of smaller tributaries decrease as the stream becomes larger. Streams of greater volume and mass are less sensitive to natural and human sources of heat.

A common measure of chronic and acute stream temperature exposure is the maximum weekly maximum temperature (MWMT) (Carter, 2005). The MWMT is also known as the seven-day average of daily maximum temperature (7-DADM). The upper optimal MWMT temperature for juvenile steelhead rearing and growth is 60.8°F; with temperatures above 71.6 – 75.2°F in the lethal range (Richter and Kolmes, 2005). The PACFISH RMO for water temperature is to maintain water temperature < 64 F. The ODEQ water temperatures standards are shown in Table 14. The beneficial use for all streams in the CERA is designated as “Salmon and Trout Rearing and Migration” except for Broady Creek and W.F. Broady Creek which are designated as “Core Cold Water Habitat”.

Table 14. Oregon's biologically-based numeric temperature criteria (ODEQ 2007)

Beneficial Use	Temperature Criteria[a]	Season
Bull Trout Spawning and Rearing	12.0°C (53.6°F)	Year round
Salmon and Steelhead Spawning	13.0°C (55.4°F)	Varies by geography
Core Cold Water Habitat	16.0°C (60.8°F)	Year round[b]
Salmon and Trout Rearing and Migration	18.0°C (64.4°F)	Year round[b]

a = Stream temperature is calculated using the average of seven consecutive daily maximum temperatures on a rolling basis (7-day average of the daily maximum).
b = Except during periods when superseded by spawning criteria.

Cold Springs Allotment

Water temperatures in Cold Spring Allotment have been monitored on lower Cottonwood Creek (2015 – 2018) and upper Cottonwood Creek (2017 – 2018).

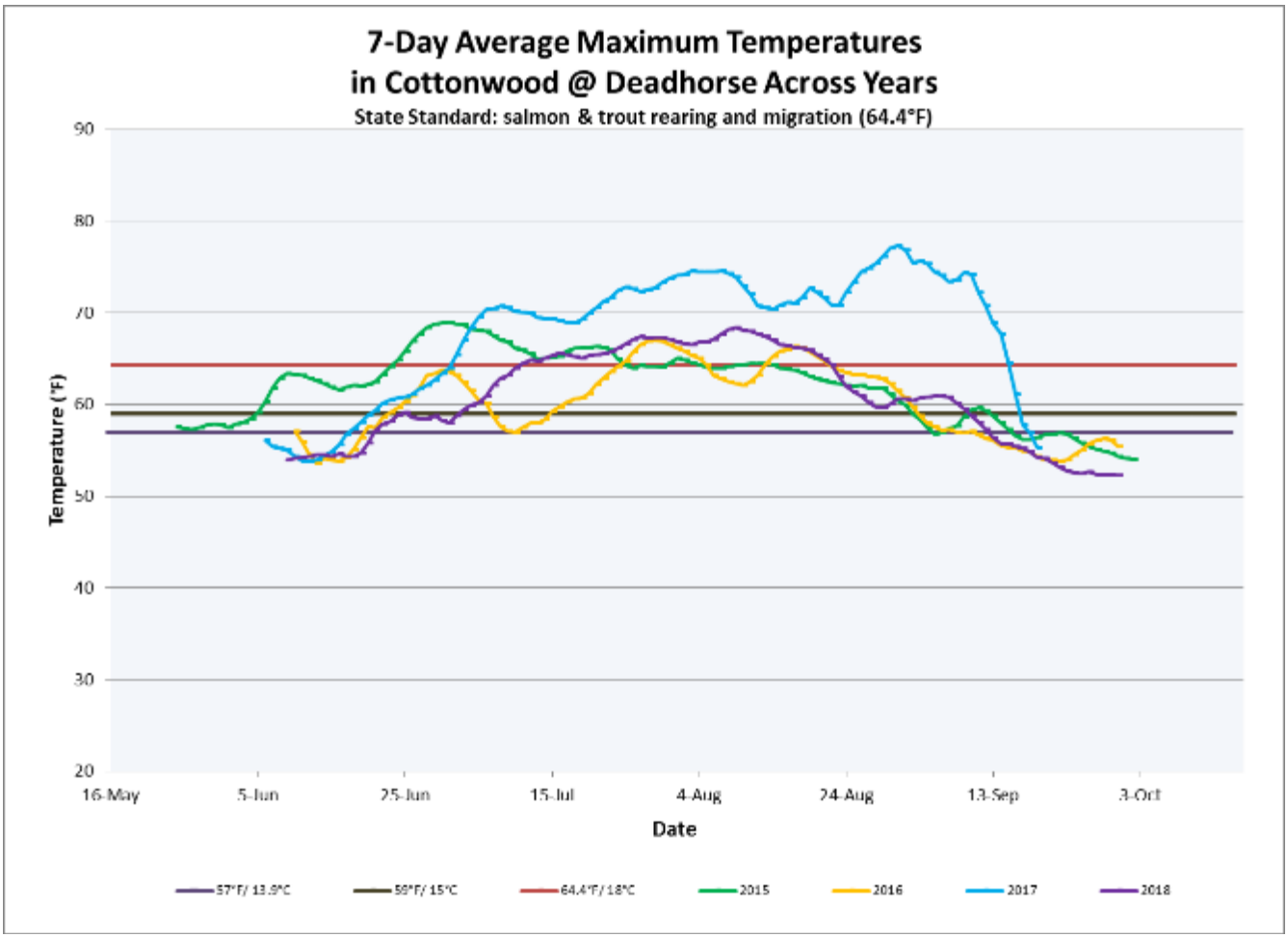

Figure 2. Water temperatures in lower Cottonwood Creek at Deadhorse Creek, 2015 - 2018. PACFISH RMO < 64°F; ODEQ Standard < 64.4°F.

Water temperatures in lower Cottonwood Creek on the Cold Springs Allotment were generally meeting the ODEQ standard for Salmon and Trout Rearing and Migration habitat (64.4°F) in 2015 and 2016. A large debris flow event occurred in the spring of 2017 which resulted in the loss of the majority of riparian vegetation that provided stream shading and stream temperatures were higher than

had been recorded in prior years. Stream temperatures declined in 2018 compared to 2017 as riparian vegetation recovered from the 2017 debris flow event (Figure 3).

Water temperatures in upper Cottonwood Creek on the Cold Springs Allotment are consistently meeting the ODEQ standard for Salmon and Trout Rearing and Migration habitat (64.4°F), and the PACFISH RMO (64°F) (Figure 4).

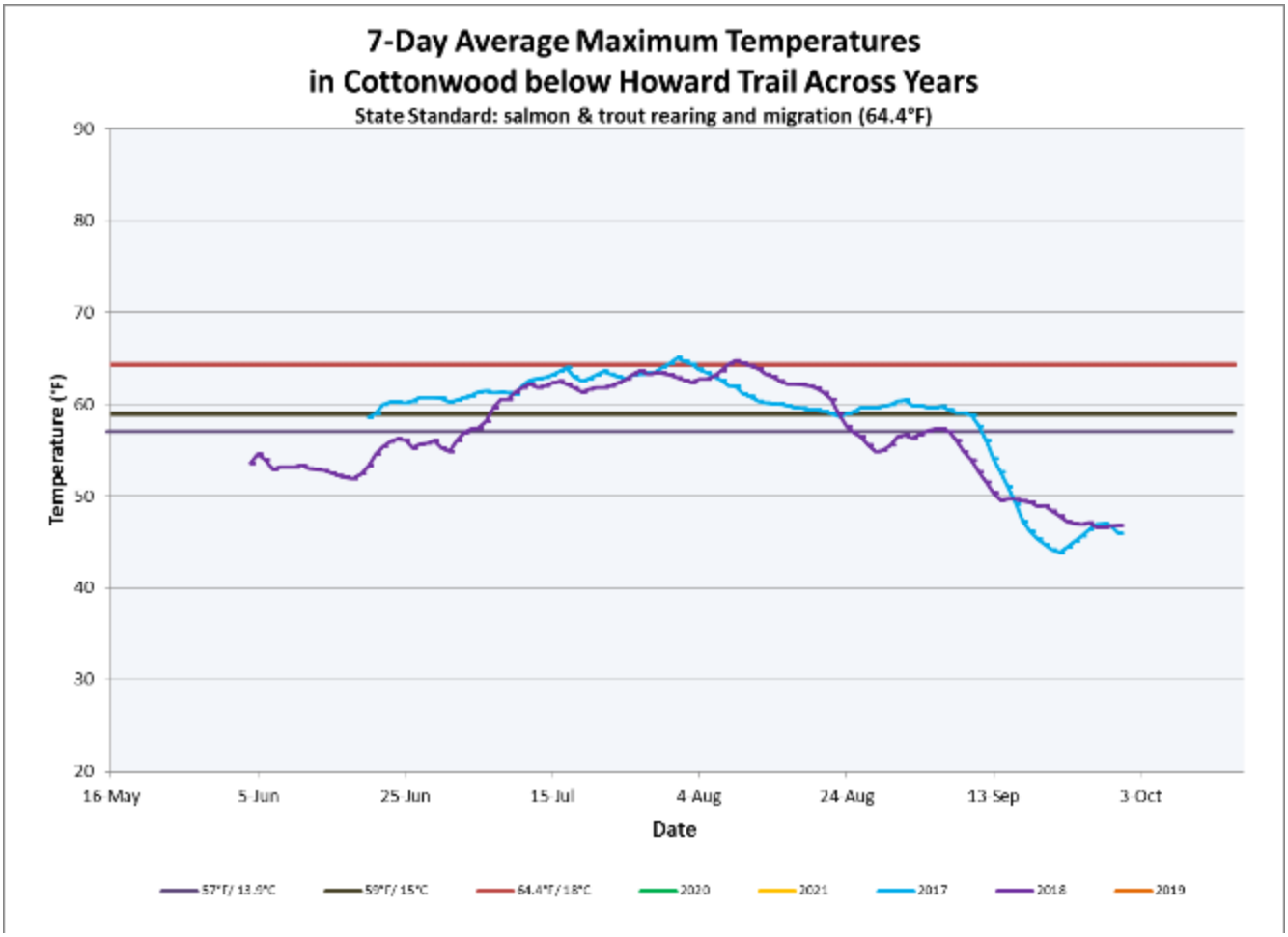

Figure 3. Water temperatures in upper Cottonwood Creek near the Howard Cutoff crossing, 2017 - 2018. PACFISH RMO < 64°F; ODEQ Standard < 64.4°F.

Teepee Elk Allotment

Water temperatures have been monitored in Broady Creek over multiple years; the most recent period being 2011 – 2018. Water temperature in Broady Creek are meeting requirements for salmonids (Figure 4). Water temperatures in Broady Creek consistently meet the ODEQ standard for core cold water habitat (<60.8 F).

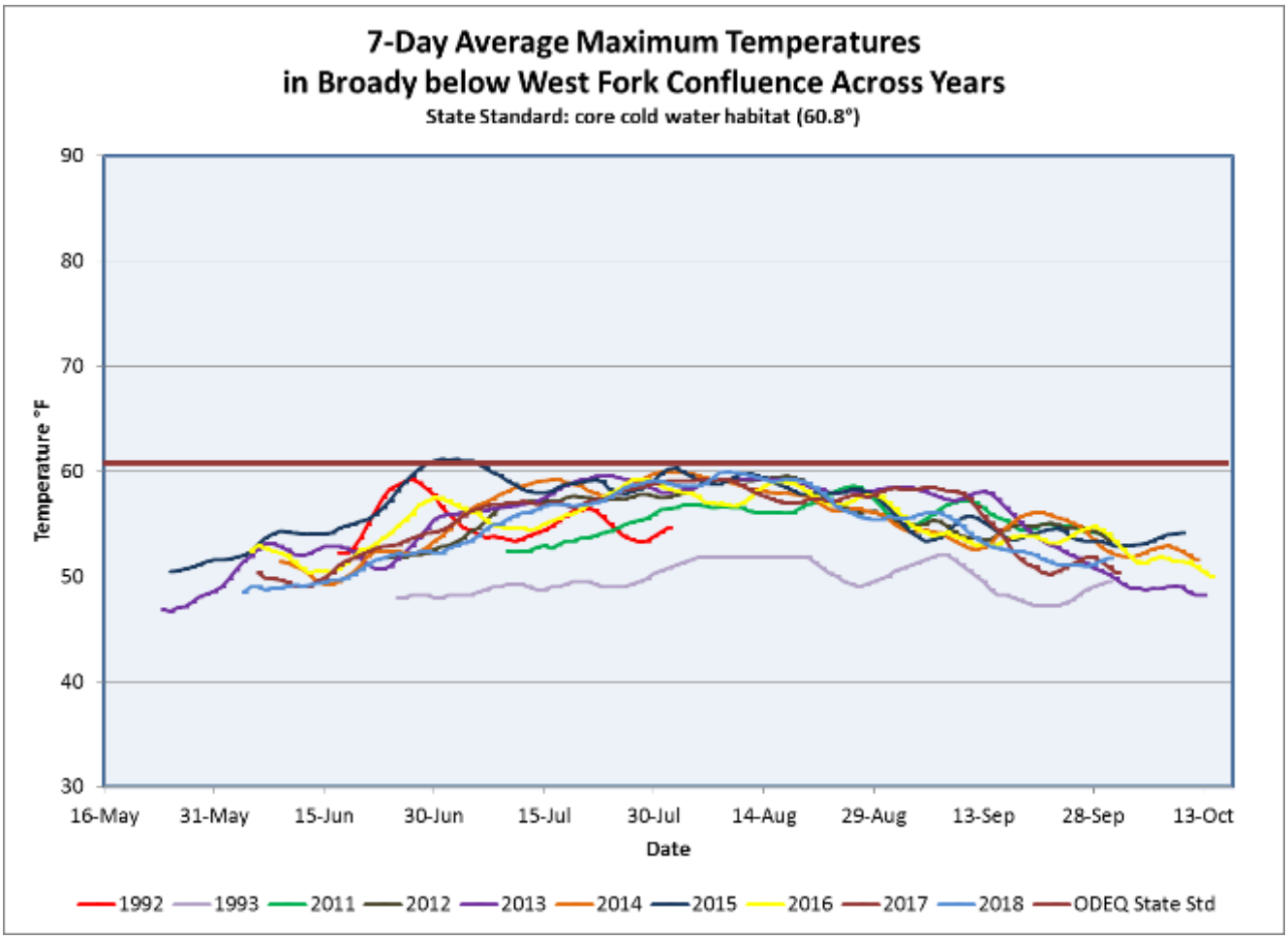

Figure 4. Water temperature in Broady Creek below the confluence with W.F. Broady Creek. PACFISH RMO = 64°F; ODEQ Standard < 60.8 F.

Water temperatures were monitored in E.F. Broady Creek for two years; 2016 and 2017. Water temperature in E.F. Broady Creek are meeting requirements for salmonids (Figure 5). Water temperatures in E.F Broady Creek consistently met the ODEQ standard for core cold water habitat (<60.8 F).

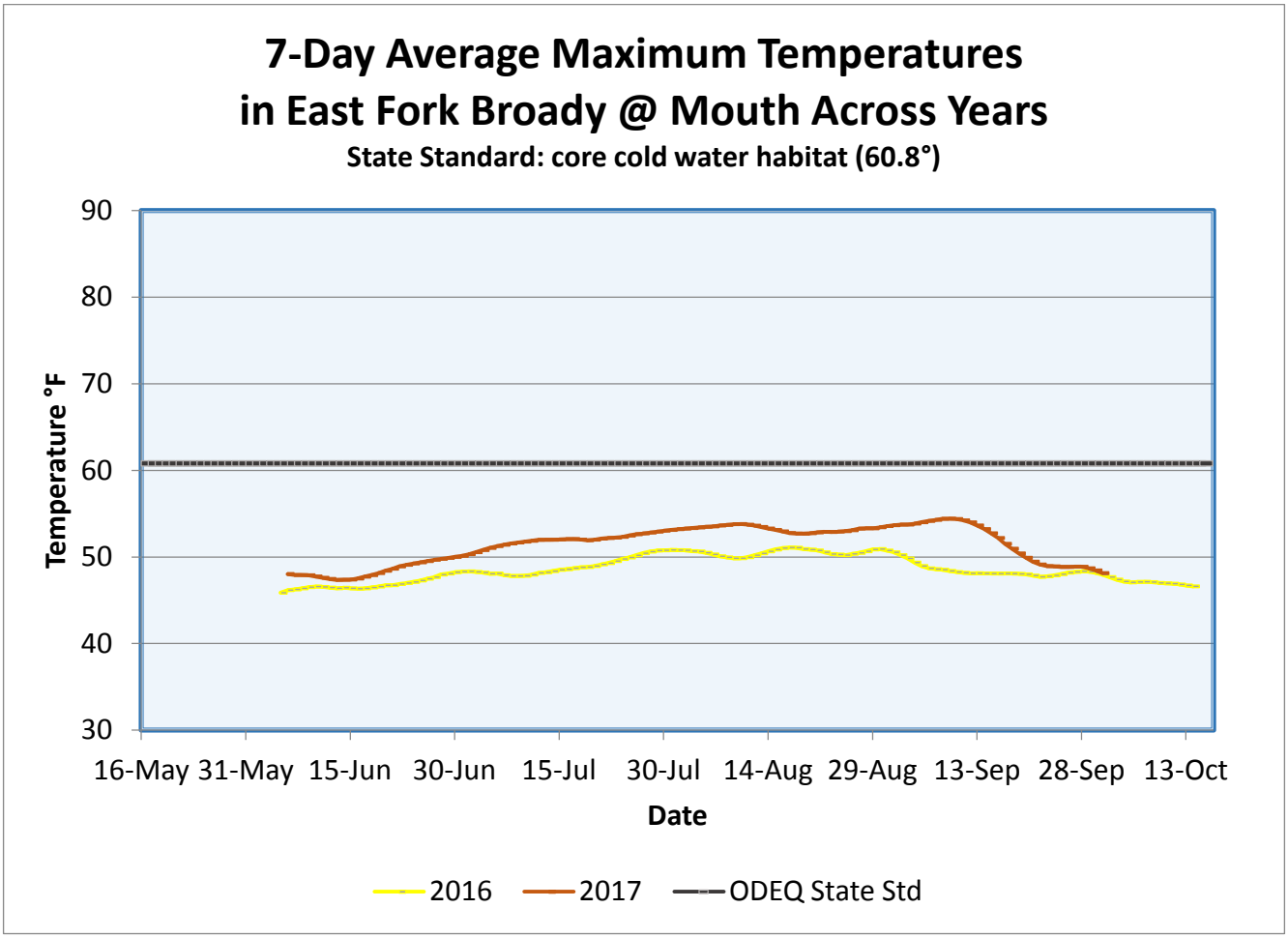

Figure 5. Water temperature in E.F Broady Creek at mouth. PACFISH RMO = 64°F; ODEQ Standard < 60.8 F.

Summary of Stream/Riparian Habitat Conditions

Cold Springs Allotment

Cottonwood Creek provides all of the spawning and rearing habitat for SR steelhead on the Cold Springs Allotment. Recovery of riparian vegetation from the 1988 Teepee Butte Fire was occurring until the 2017 debris flow event that affected about half the channel length on the allotment. The channel incised about 4 feet in many places, LWD was flushed from the reach, and riparian vegetation (including streambank stabilizing vegetation) was scoured away during the debris flow event. By 2018, riparian vegetation was recovering, and the channel was reorganizing into distinct channel units. However, much of the pool habitat and LWD present prior to the debris flow are no longer present. Streambanks are also prone to erosion due to the loss of streambank stabilizing vegetation. Thus, fine sediment levels are likely to increase in the near future as bank erosion occurs. Recovery of aquatic habitat features (i.e. pools, spawning gravels, LWD) will likely take decades while recovery of riparian vegetation is occurring at a much faster rate.

Other streams on the allotment; Basin Creek, Bear Creek, and Horse Creek; are Category 4 streams that do not provide habitat for SR steelhead. Cook Creek, along the eastern boundary of the allotment and a tributary to the Snake River, provides habitat for a resident population of redband trout. This population is isolated from SR steelhead by a natural barrier. Cook Creek has a relatively healthy riparian area however Himalayan blackberry has invaded along the edges of the riparian area. Himalayan blackberry is a threat to native riparian communities in the canyon country due to changes in fire regimes following its establishment and its ability to crowd out native vegetation.

Teepee Elk Allotment

E.F. Peavine Creek and Broady Creek provide all of the spawning and rearing habitat for SR steelhead on the Teepee Elk Allotment. Based on observations and data from MIMs and stream surveys, E.F. Peavine Creek is not meeting objectives for aquatic or riparian habitat. Impacts from previous timber harvest and road construction are still apparent along E.F. Peavine Creek. The current practice of grazing the Elk pasture in the latter half of the grazing season every year appears to be preventing a recovery of E.F. Peavine Creek. Changing the season of use to the early part of the grazing season would result in a reduction in cattle presence along the creek and allow for a near natural rate of recovery.

Broady Creek has been designated as the only Core Cold Water habitat in the entire Joseph Creek system. Water temperatures are consistently meeting the ODEQ temperature standard. Broady Creek has primarily been impacted by road construction and associated timber harvest. There are low levels of pool habitat and LWD, fine sediment levels are higher than desired. Current grazing does not appear to be impacting aquatic and riparian habitat of Broady Creek.

D. MANAGEMENT HISTORY

Cold Springs Allotment

The Cold Springs Allotment is currently grazed by cows with calves between June 1 and October 31 each year for a total of 2165 head months and 24 horse head months, where 1 head month equals one cow/calf pair or horse for one month. As a result of the 1998 ESA consultation, North Cold Springs and North Wildhorse pastures were identified for early use (prior to July 1) to avoid disturbance of redds where spawning habitat is present and accessible to livestock in other pastures on the allotment. Pastures with a use date of after July 1 were Horse Creek, Lower Bear, and Lower Basin pastures. Additionally, grazing in the Lower Cottonwood pasture was deferred until fall months.

Implementation Monitoring Results

Sporadic implementation monitoring has occurred in riparian areas over the last 14 years (Table 15). Additionally, monitoring points and names have changed over the last 14 years making it difficult to spatially locate the points where monitoring actually occurred. The current permittee has been on the allotment since 2006.

Table 15. Implementation monitoring data for the Cold Springs Allotment.

Pasture	Key Area (Stream Name)	Habitat Type Monitored	Year	Metric Monitored	End of Season Measurement	Desired Condition in AOI	Desired Condition Met?
S. Cold Springs	K2A (E.F.	Riparian-Ter	2010	Stubble Ht	4”	3”	Y

Pasture	Key Area (Stream Name)	Habitat Type Monitored	Year	Metric Monitored	End of Season Measurement	Desired Condition in AOI	Desired Condition Met?
	Cottonwood Cr)						
S. Cold Springs	K2A (E.F. Cottonwood Cr)	Riparian-GL	2010	Stubble Ht	6″	4″	Y
S. Cold Springs	K2A (E.F. Cottonwood Cr)	Riparian-GL	2010	Bank Alt	33%	20%	N
S. Wildhorse	K9 (E.F. Broady Cr)	Riparian-GL	2010	Stubble Ht	7	4″	Y
S. Wildhorse	K9 (E.F. Broady Cr)	Riparian-GL	2010	Shrub Browse	14%	40%	Y
S. Wildhorse	K9 (E.F. Broady Cr)	Riparian-GL	2010	Bank Alt	53%	20%	N
S. Cold Springs	K5 (E.F. Cottonwood Cr)	Riparian-GL	2008	Shrub Browse	0%	40%	Y
S. Cold Springs	K5 (E.F. Cottonwood Cr)	Riparian-GL	2008	Bank Alt	0%	20%	Y
S. Cold Springs	K5 (E.F. Cottonwood Cr)	Riparian-GL	2008	Stubble Ht	18″	4″	Y
Upper Cottonwood	K6 (Cottonwood Cr)	Riparian-Ter	2008	Stubble Ht	18″	3″	Y
Upper Cottonwood	K6 (Cottonwood Cr)	Riparian-GL	2008	Shrub Browse	0%	40%	Y
Upper Cottonwood	K6 (Cottonwood Cr)	Riparian-Ter	2008	Stubble Ht	16″	3″	Y
Upper Cottonwood	K6 (Cottonwood Cr)	Riparian-GL	2008	Bank Alt	0%	20%	Y
N. Cold Springs	K2A (Horse Cr Trib)	Riparian-GL	2006	Stubble Ht	16″	4″	Y
N. Cold Springs	K2A (Horse Cr Trib)	Riparian-GL	2006	Shrub Browse	5%	40%	Y
Horse Creek	K1 (Horse Cr)	Riparian-GL	2006	Bank Alt	1%	20%	Y
Horse Creek	K1 (Horse Cr)	Riparian-GL	2004	Bank Alt	1%	20%	Y
Lower Bear	K4 (unknown)	Riparian-GL	2004	Shrub Browse	5%	40%	Y
Lower Cottonwood	K3 (Cottonwood Cr)	Riparian-GL	2004	Stubble Ht	16″	4″	Y
South Cold Springs	K5 (E.F. Cottonwood Cr)	Riparian-GL	2004	Stubble Ht	16″	4″	Y
Upper Cottonwood	K6 (Cottonwood Cr)	Riparian-GL	2004	Stubble Ht	16″	4″	Y

Notes: Riparian-GL = riparian greenline, Riparian-Ter = riparian terrace

Teepee Elk Allotment

The Teepee Elk Allotment is currently grazed by cows with calves between June 1 and October 31 each year for a total of 880 head months and 24 horse head months, where 1 head month equals one cow/calf pair or horse for one month.

Implementation Monitoring Results

Sporadic implementation monitoring has occurred in the Teepee Elk Allotment over the last 14 years (Table 16).

Table 16. Implementation monitoring data for the Teepee Elk Allotment.

Pasture	Key Area (Stream)	Habitat Type Monitored	Year	Metric Monitored	End of Season Measurement	Desired Condition in AOI	Desired Condition Met?
Elk Pasture	K3A (E.F. Peavine Cr)	Riparian-GL	2016	Bank Alt	3%	20%	Y
Elk Pasture	K3A (E.F. Peavine Cr)	Riparian-GL	2016	Stubble Ht	12"	4"	Y
Elk Pasture	K3A (E.F. Peavine Cr)	Riparian-Ter	2016	Stubble Ht	5"	3"	Y
Elk Pasture	K3 (E.F. Peavine Cr)	Riparian-GL	2009	Bank Alt	16%	20%	Y
Elk Pasture	K3 (E.F. Peavine Cr)	Riparian -GL	2009	Stubble Ht	8"	4"	Y
Elk Pasture	K3 (E.F. Peavine Cr)	Riparian-Ter	2009	Stubble Ht	14"	3"	y
Elk Pasture	K3 (E.F. Peavine Cr)	Riparian-Ter	2007	Stubble Ht	5"	3"	Y
Elk Pasture	K3 (E.F. Peavine Cr)	Riparian-GL	2007	Stubble Ht	4"	4"	Y
Elk Pasture	K3 (E.F. Peavine Cr)	Riparian-Ter	2006	Stubble Ht	4.5"	3"	Y
Elk Pasture	K3A (E.F. Peavine Cr)	Riparian-GL	2006	Stubble Ht	5"	4"	Y
Elk Pasture	K3A (E.F. Peavine Cr)	Riparian-Ter	2006	Stubble Ht	4"	3"	Y
Elk Pasture	K3 (E.F. Peavine Cr)	Riparian-GL	2006	Stubble Ht	6"	4"	Y
Elk Pasture	K3 (E.F. Peavine Cr)	Riparian-GL	2004	Stubble Ht	8"	4"	Y
Elk Pasture	K3 (E.F. Peavine Cr)	Riparian-Ter	2004	Stubble Ht	14"	3"	Y
Elk Pasture	K3 (E.F. Peavine Cr)	Riparian-GL	2004	Stubble Ht	6"	4"	Y

Notes: Riparian-GL = greenline, Riparian-Ter = terrace

E. PROPOSED ACTION

[Note: The allotment management plans for the Teepee Elk and Cold Springs allotments would be modified as necessary to be consistent when a new Forest Plan is adopted.]

The rangeland conditions within the Cold Elk Range Analysis project area are evaluated based on direction in the Forest Plan. The proposal would authorize rangeland management as described below.

Table 17. Proposed action for the allotments of the Cold Elk Range Analysis.

Allotment	Acres (National Forest)	Grazing Permit Type	Number of Pastures	Permitted Head Months	Grazing Season	Estimated number of animals
Cold Springs	30,405	Term	14	2165 cattle 24 horse	1 June to 31 October	360 cow/calves 4 horses
Teepee Elk	7,600	Term	4	880 cattle 24 horse	1 June to 31 October	175 cow/calves 4 horse

Allotment Specific Actions

Cold Springs Allotment

The allotment has one term permit. The current season of use for the allotment is June 1 through November 30. The proposed action would reauthorize the current grazing management on the Cold Springs Allotment with respect to numbers and head months. The proposed action would authorize up to 2165 cattle head months (HMs) and 24 horse HMs on NFS lands, however, the season of use would be shortened to June 1 through October 31. Minor changes would occur as needed to address unsatisfactory conditions identified during this analysis process.

The Cold Springs Allotment is 30,405 acres in size and divided into 14 pastures. A rotational grazing pattern through the pastures during the authorized season of use is used on the allotment. Based on the WWNF suitability/capability models there are about 9,144 suitable acres with an estimated 3,774 HMs (4,982 AUMs) available on the allotment that would provide forage for 629 cows for the proposed grazing period.

Annual authorization of HMs would be determined following assessment of the previous season's monitoring of livestock management, implementation monitoring and effectiveness monitoring to determine movement towards or obtainment of resource objectives. Should available forage increase or decrease due to climatic or forest vegetation management actions, the HM authorization may be adjusted to allow utilization of the available forage while meeting the site-specific resource management objectives. Any increases in permitted numbers or HM's would require a supplemental NEPA analysis and decision and be based on monitoring of the long-term ability of the existing management to meet the standards and objectives identified in the Wallowa-Whitman NF Land Resource Management Plan (LRMP).

Changes to Current Management

- Reduce the season of use from June 1 through November 30 to June 1 through October 31 while maintaining the same number of HMs. (Fewer cows for longer period compared to more cows for shorter period)
- Construct new fence at the perimeter of Dougherty campground
    - No grazing would occur within campground
- All pastures are available for use during the rotation of pastures from June 1 through October 31 except:
    - Lower Cottonwood – no use prior to July 1 to protect steelhead redds
    - Upper Cottonwood – no use prior to July 1 to protect steelhead redds
- Rest the Lower Cottonwood pasture of Cold Spring Allotment for 5 years, then re-evaluate stream/riparian conditions
    - To allow for stream and riparian recovery from 2017 debris flow
    - Allow grazing when a satisfactory condition as described in the Forest Plan is achieved or after 5 years of rest.
- Rest Upper Cottonwood pasture of Cold Spring Allotment every other year
- Defer pastures grazed in June at least every 3rd year

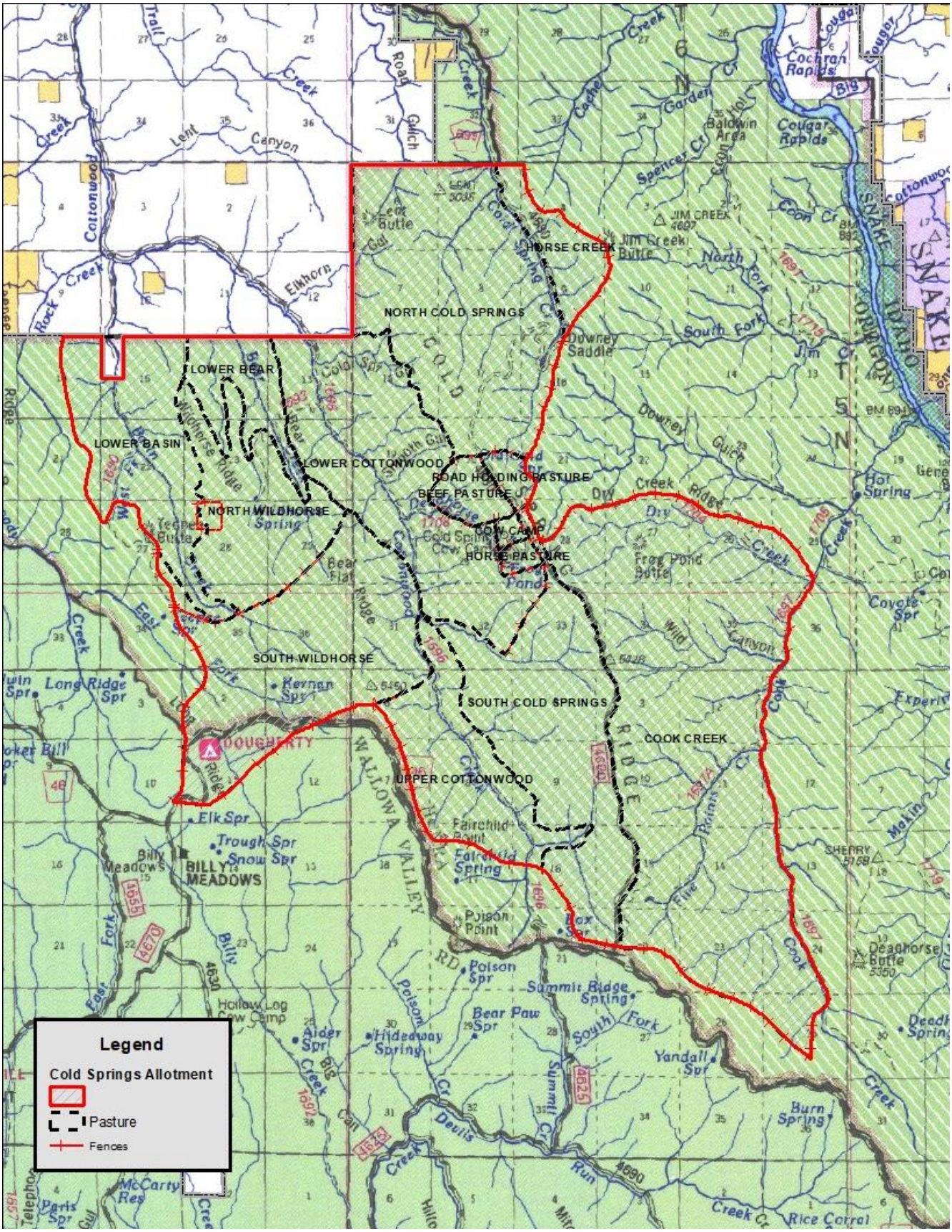

Figure 6. Cold Springs Allotment, Cold Elk Range Analysis.

Infrastructure Improvements

- Road Gulch T5N R47E section 6 center, North Cold Spring Pasture of Cold Spring Allotment
    - Construct new exclosure fence to include all of spring source
    - Install new water trough
- Old Barrel-Fence and Trough T5N R46E section 16 SW NE, Lower Basin Pasture of Cold Spring Allotment
    - Construct larger exclosure fence to include all of spring source
    - Install new water trough
- Cold Spring 1 T5N R47E Section 29 NE SE, Cow Camp of Cold Spring Allotment
    - Construct larger exclosure fence to include all of spring source
    - Install new water trough
- Cold Spring 2 T5N R47E Section 29 NE SE, Cow Camp of Cold Spring Allotment
    - Construct new exclosure Fence to include all of spring source
    - Install new water trough
- Wild Horse Spring T5N R46E section 23 SW SE, North Wild horse Pasture of Cold Spring Allotment
    - Construct larger exclosure fence to include all of spring source
    - Install new water trough
- Construct 4 drift fences on the Cold Spring Allotment (Fig. 7, the intent is to have these fences constructed within 2 years of signing the NEPA decision)
    - Dry Creek Fence in the Cook Creek Pasture (if the Dry Creek Trail is reopened, redband trout habitat protection)
    - 5 Points Fence in the Cook Creek Pasture (redband trout habitat protection)
    - Howard Cutoff Trail/E.F. Cottonwood Fence in the Upper Cottonwood Pasture (steelhead habitat protection)
    - Deadhorse Creek Fence on the boundary of the Beef Pasture and Lower Cottonwood Pasture (steelhead habitat protection)

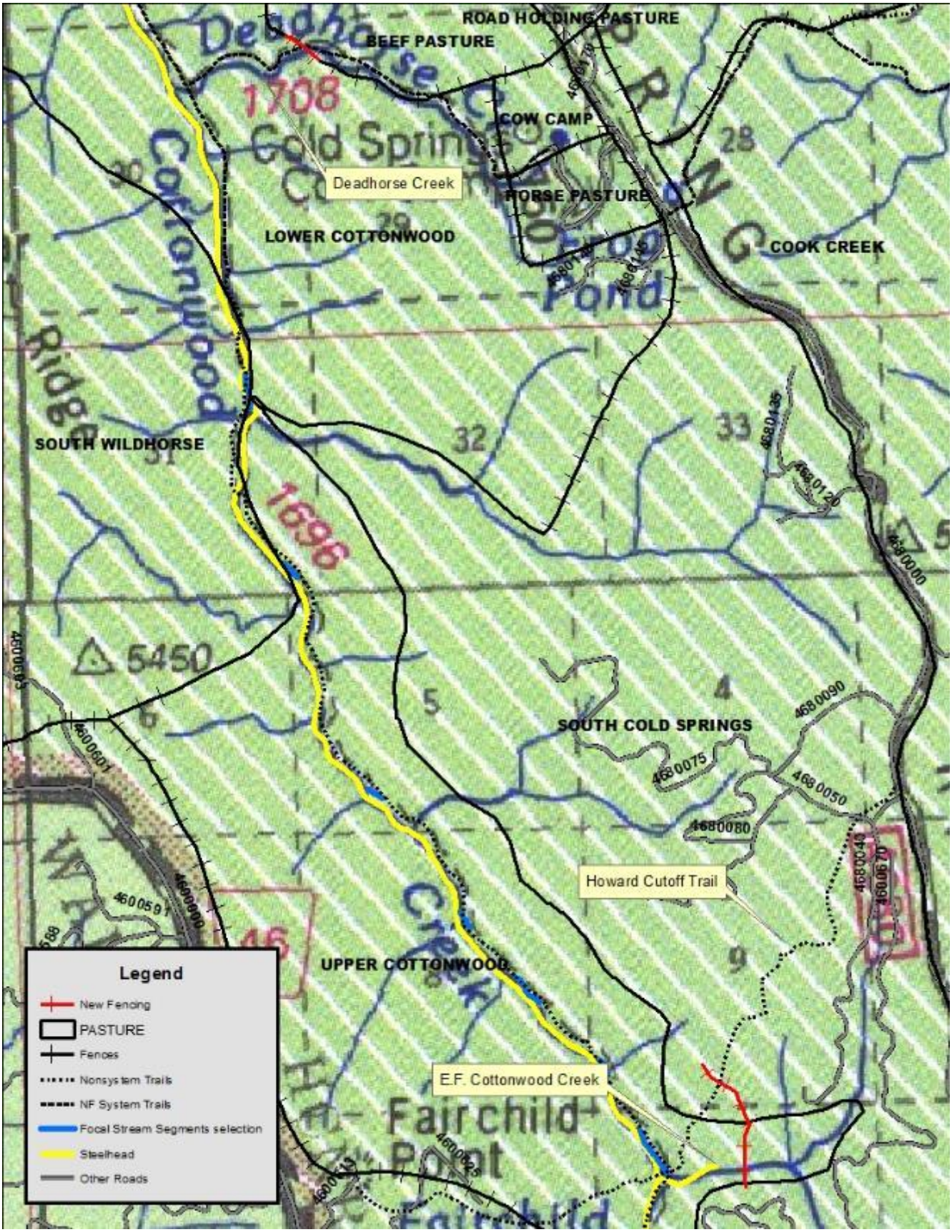

Figure 7. Locations of new fencing for protecting steelhead spawning areas on the Cold Springs Allotment

Pasture Use Timing for Protection of Aquatic Resources

The following timing restrictions are proposed for pastures in the Cold Springs Allotment during the permitted use period for the allotment to avoid adverse effects to ESA-listed fish:

- Restrict use along Cottonwood Creek in the Lower Cottonwood pasture to after July 1.
- Restrict use of the Upper Cottonwood pasture to after July 1.

Conservation Measures for Recovery and Maintenance of Aquatic Habitat

The methods used to limit livestock impacts on riparian/stream habitats on the Cold Springs Allotment under the proposed action are:

- Ensure terms and conditions of grazing permit are met regarding maintenance of fences and water developments, and authorized use periods.
- Adopt new implementation and effectiveness monitoring indicators/objectives into new Allotment Management Plan (see Monitoring section of the Proposed Action).
- Meet objectives for in-season and end of season grazing indicators for streambanks and riparian vegetation. Monitor long-term indicators every 3 to 5 years to determine if restoration and maintenance of streambank integrity and late seral riparian vegetation is occurring. Adjust grazing, and in-season and annual grazing indicators as needed to accomplish restoration and maintenance of streambank integrity and late seral riparian vegetation. (See E. Monitoring)
- When objectives for end of season indicators are not met develop a mid-season monitoring strategy with the permittee.

Teepee Elk Allotment

Teepee Elk Allotment would be grazed by cows with calves between June 1 and October 31 each year. The proposed use of the allotment is 880 cattle head months and 24 horse head months, where 1 head month equals one cow/calf pair for one month, or one adult horse for one month. The proposed action would include construction of a riparian exclosure fence along E.F. Peavine Creek in the Elk pasture.

The allotment has one term permit. The Teepee Elk Allotment is 7,600 acres in size and divided into 4 pastures. A rotational grazing pattern through the pastures during the authorized season of use is used on the allotment. Based on the WWNF suitability/capability models there are about 2,130 suitable acres with an estimated 879 HMs (1161 AUMs) available on the allotment that would provide forage for 176 cows for the proposed grazing period.

Annual authorization of HMs would be determined following assessment of the previous season's monitoring of livestock management, implementation monitoring and effectiveness monitoring to determine movement towards or obtainment of resource objectives. Should available forage increase or decrease due to climatic or forest vegetation management actions, the HM authorization may be adjusted to allow utilization of the available forage while meeting the site-specific resource management objectives. Any increases in permitted numbers or HM's would require a supplemental NEPA analysis and decision and be based on monitoring of the long-term ability of the existing management to meet the standards and objectives identified in the Wallowa-Whitman NF Land Resource Management Plan (LRMP).

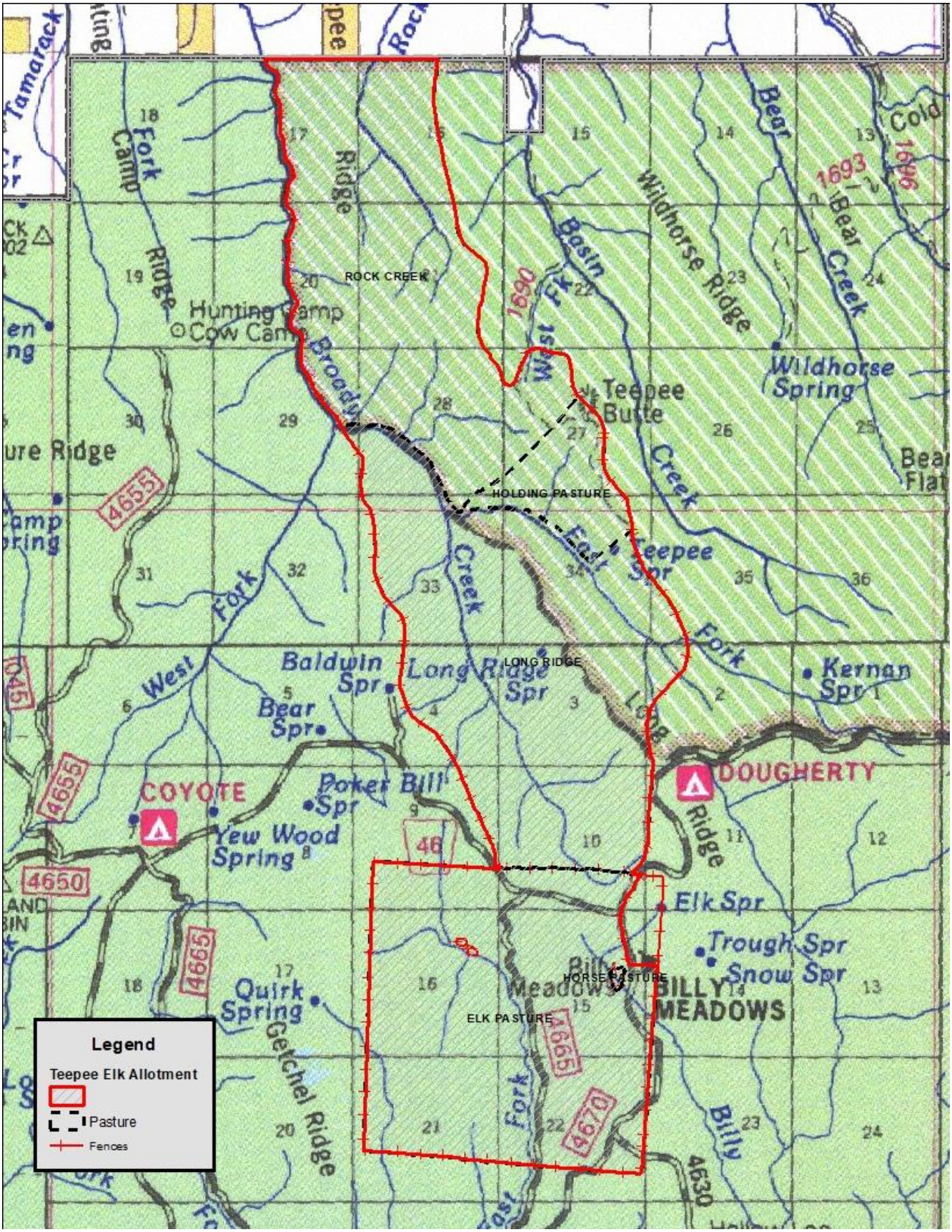

Figure 8. Teepee Elk Allotment, Cold Elk Range Analysis.

Changes to Current Management

- Exclude cattle from grazing E.F. Peavine Creek within Elk Pasture
    - Construct about 3 miles of fence
    - Enclose about 1.5 miles and estimated 60 acres of Peavine Creek
    - Water gaps about each ½ mile
    - Grazing not proposed within exclosure
    - Fence material will be provided by the Forest Service, construction by Forest service, Permittee, Contractor, grant or some other source as is possible. Anticipated completion date of two field seasons after signing of decision. The intent is to have these fences constructed within 2 years of signing the NEPA decision.
- All pastures within the Teepee Elk Allotment are available for use during the rotation of pastures from June 1 through October 31 except:
    - Elk pasture restricted to after July 1 until the E.F. Peavine Creek exclosure is constructed
- Defer pastures grazed in June at least every 3rd year

Infrastructure Improvements

- Long Ridge 2 T4N R46E section 3, Long Ridge Pasture of Teepee Elk Allotment
    - Construct larger exclosure fence to include all of spring source
    - Install new water trough

Pasture Use Timing for Protection of Aquatic Resources

The following timing restrictions are proposed for pastures in the Teepee Elk Allotment during the permitted use period for the allotment to avoid adverse effects to ESA-listed fish:

- Restrict use of the Elk pasture to after July 1. When the proposed exclosure is constructed around potential spawning habitat in E.F. Peavine this restriction would no longer be applicable.

Conservation Measures for Recovery and Maintenance of Aquatic Habitat

The methods used to limit livestock impacts on riparian/stream habitats on the Teepee Elk Allotment under the proposed action are:

- Ensure terms and conditions of grazing permit are met regarding maintenance of fences and water developments, and authorized use periods.
- Adopt new implementation and effectiveness monitoring indicators/objectives into new Allotment Management Plan (see Monitoring section of Proposed Action).
- Meet objectives for in-season and annual grazing indicators for streambanks and riparian vegetation. Monitor long-term indicators every 3 to 5 years to determine if restoration and maintenance of streambank integrity and late seral riparian vegetation is occurring. Adjust grazing, and in-season and annual grazing indicators as needed as needed to accomplish restoration and maintenance of streambank integrity and late seral riparian vegetation. (See F. Monitoring).
- When objectives for end of season indicators are not met develop a mid-season monitoring strategy with the permittee.
- When objectives for end of season indicators are not met develop a mid-season monitoring strategy with the permittee.

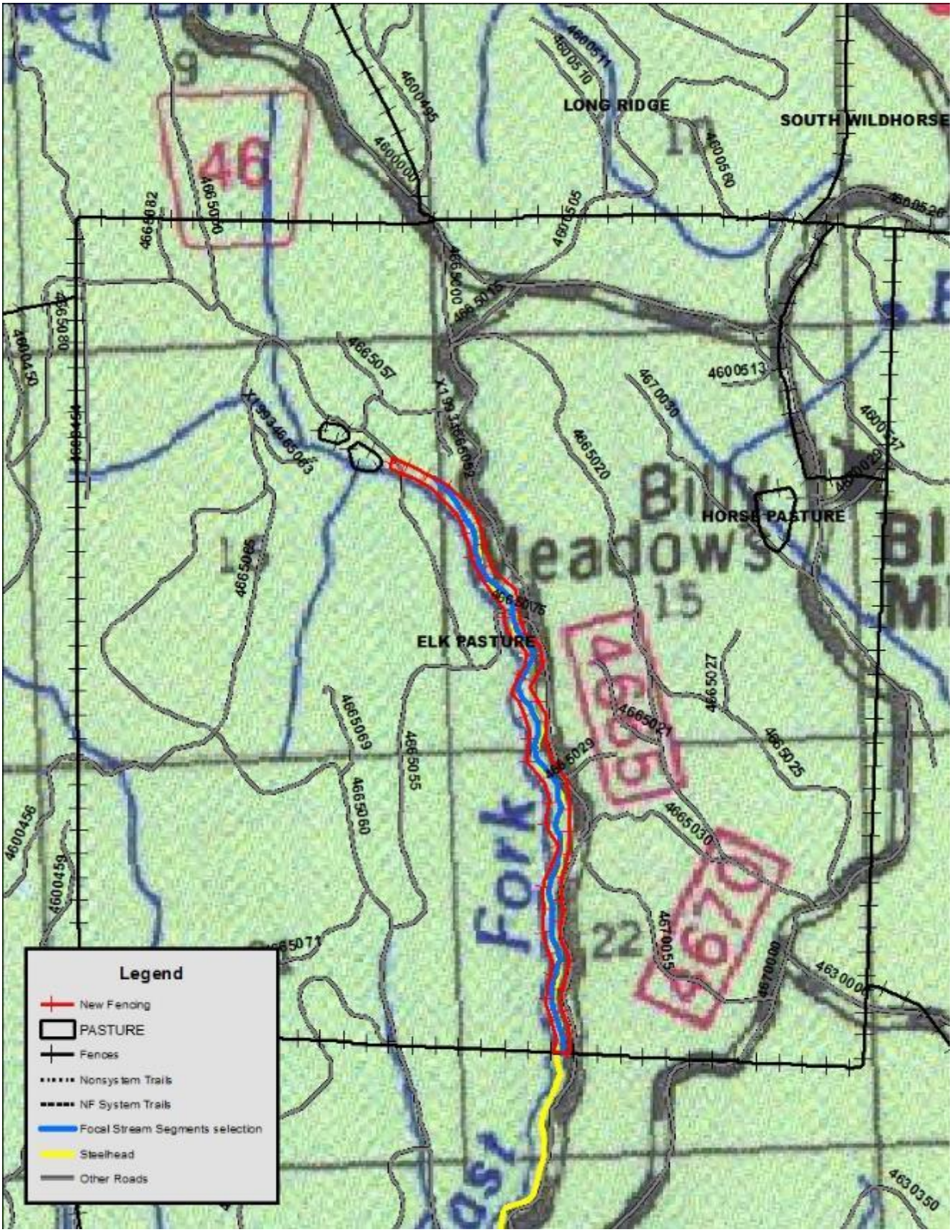

Figure 9. Location of exclosure on E.F. Peavine Creek on the Teepee Elk Allotment.

Monitoring and Adaptive Management

The proposed monitoring strategy for the allotments in the CERA project will utilize: 1) Forest Plan utilization monitoring, 2) riparian monitoring along selected reaches of streams, and 3) any monitoring requirements that result from consultation for ESA-listed species.

Forest Plan Utilization Standards

The LRMP set utilization standards to assure continued maintenance or improvement of the vegetation and soils conditions. Maximum utilization standards have been set for both riparian and upland vegetative communities depending on the condition rating of satisfactory or unsatisfactory (Table 18).

Shrubs will be measured by annual growth remaining. The utilization standards are maximum levels of use regardless of which animal species uses the forage or browse the shrubs. Livestock management will be adjusted prior to these standards being exceeded. If the standards do not maintain the desired conditions, a more restrictive standard can be prescribed.

Table 18. Forest plan allowable utilization standards

Range Condition	Riparian		Upland		
	Grass and grass-like species	Shrubs	Grass and grass-like species		Shrubs
			Forested	Grasslands	
Satisfactory	45%	40%	45%	55%	40%
Unsatisfactory	0-35%	30%	35%	35%	30%

To determine compliance with utilization standards, the Forest Service range manager will measure utilization during and after the grazing season. Riparian vegetation (terraces) and upland monitoring occurs in areas that are representative of the overall pasture. If the range manager visually identifies an area of concern or where forage utilization would lead to unacceptable resource conditions, more intensive measurements will be taken.

The utilization standards described in Table 18 are applied at key monitoring areas in all pastures of allotments in the CERA project. Key areas have been established at representative locations within each pasture for Forest Plan monitoring. Key areas may be moved as needed if it is determined that the existing key area is not representative of livestock utilization within the pasture. Small areas within the allotments that have unavoidable livestock concentrations such as salt licks, water developments, gateways or corrals, are not designated as key areas.

Riparian Monitoring

The intent of the WMO riparian monitoring to provide FS managers and permittees with information necessary to adaptively manage riparian resources with respect to livestock grazing. The riparian monitoring consists of end of season (implementation) and long-term (effectiveness) monitoring. The stream/riparian monitoring utilizes the Multiple Indicator Monitoring (MIM) protocol (Burton et al, 2011). This protocol or an updated version of it will be used for the WMO riparian monitoring. Data derived from this monitoring will be used to identify if adaptive management changes are required. See the monitoring discussion in Appendix B for more background on the MIM protocol.

Due to limited resources (i.e. time and personnel), establishment of DMAs is being prioritized so that allotments with known problems are addressed first. DMAs have been established on E.F. Peavine Creek and Broady Creek (Teepee Elk Allotment); and lower and upper Cottonwood Creek (Cold Springs Allotment) to develop baseline conditions and monitor changes in riparian conditions as a

result of the proposed changes in grazing under the proposed action. A DMA was also established on Horse Creek. However, Horse Creek on the Cold Springs Allotment does not provide spawning or rearing habitat for steelhead and therefore will not be monitored in the future.

Implementation Monitoring

Riparian objectives for end of season indicators for the CERA allotments are based on the existing condition of riparian areas, trend of riparian conditions, performance of the permittee in meeting objectives for annual indicators, and recommendations from the PACFISH/INFISH Enclosure B. End of season indicators are greenline stubble height, woody browse, and streambank alteration.

For the two allotments the following implementation monitoring indicators and objectives will be incorporated into allotment management plans:

- Streambank Alteration: ≤20% (end of season)
- Greenline Stubble Height (PFC Pastures): ≥4 inches (end of season)
- Greenline Stubble Height (FAR Pastures): ≥6 inches (end of season)
- Riparian Shrub Utilization: ≤30-40% (end of season)

Objectives for these indicators will be adjusted as conditions change on the ground. See Table 19 for objectives for implementation monitoring on the CERA allotments.

Table 19. End of season objective for implementation monitoring indicators

Allotment	Pasture	Stream	Riparian Rating	Indicators	End of Season Objective
Cold Springs	Lower Cottonwood	Cottonwood Creek	FAR	Greenline Stubble Height	≥6 inches
				Streambank Alteration	≤20%
				Riparian Shrub Utilization	≤35%
	Upper Cottonwood	Cottonwood Creek	PFC	Greenline Stubble Height	≥4 inches
				Streambank Alteration	≤20%
				Riparian Shrub Utilization	≤35%
	South Wildhorse	Cottonwood Creek[1]	FAR	Greenline Stubble Height	≥6 inches
				Streambank Alteration	≤20%
				Riparian Shrub Utilization	≤35%
Teepee Elk	Elk	E.F. Peavine Creek	FAR	Greenline Stubble Height	≥6 inches
				Streambank Alteration	≤20%
				Riparian Shrub Utilization	≤35%
	Rock Creek	Broady Creek	PFC	Greenline Stubble Height	≥4 inches
				Streambank Alteration	≤20%
				Riparian Shrub Utilization	≤35%
	Long Ridge	Broady Creek	PFC	Greenline Stubble Height	≥4 inches
				Streambank Alteration	≤20%
				Riparian Shrub Utilization	≤35%

Notes: 1) Cottonwood Creek in the South Wildhorse pasture is assumed to be within the area affected by the 2017 debris flow event.

In order to meet and not exceed objectives for end of season indicators in pastures with ESA-listed fish or Designated Critical Habitat, permittees will conduct trigger monitoring midway during the grazing season in each pasture and notify their range management specialist when they think livestock should be moved to the next pasture or off the Forest.

Trigger monitoring can vary from numerical measurements of stubble height, streambank alteration and/or riparian shrub utilization to more qualitative indicators that permittees have developed to inform them of when to begin moving livestock from a pasture in order to successfully meet without exceeding end of season objectives. It is acceptable for permittee ocular monitoring to be a stubble height estimate for all grass and grass-like species along the greenline, not specific to hydric species.

Where there are non-compliances, the following year the FS will conduct mid-season trigger monitoring and collect data in lieu of permittee observations.

Effectiveness Monitoring

Effectiveness monitoring is monitoring that verifies that management prescriptions are meeting on-the-ground resource objectives, e.g., that vegetative conditions are improving. At each DMA, channel morphology and vegetation characteristics are inventoried and tracked over time. Measurements may include channel cross-sections, vegetation composition, effective ground cover and streambank stability.

Trend in riparian vegetation/habitat by pasture is monitored through permanent photo points and vegetation plots that are designed to be repeated every 3 to 5 years using the MIM protocol. These records are on file at the Wallowa Mountains Office.

Table 20 shows the effectiveness monitoring indicators and objectives that will be incorporated into allotment management plans for the CERA allotments

Table 20. Effectiveness monitoring indicators and objectives. Note: These objectives may be adjusted in the future as needed meet PACFISH Standard RM-1.

Indicator	Perennial DMA Objective	Intermittent DMA Objective
Streambank Stability (%)	≥90	≥90
Streambank Cover (%)	≥90	≥90
Fine Sediment (%)	<20	<20
Greenline Ecological Status Rating	>61 (Late)	>52 (Upper Mid)
Site Wetland Rating	≥67 (FACW+)	≥58 (FAC+)
Winward Greenline Stability Rating	>6 (High)	>5.5 (Mid)
Shade Index	≥3 (High)	≥3 (High)

WWNF Range Monitoring Strategy

This monitoring strategy is based on those areas where known ESA listed fish spawning overlaps with livestock grazing. USFS District range and fisheries personnel will work together to determine when and where annual monitoring will occur, and include the following level of implementation monitoring:

1. USFS range managers will instruct (via annual meetings and AOIs) grazing permittees each year to notify permit administrators when they think use indicator triggers are nearing or have been reached (e.g. stubble height or streambank alteration) and they are going to move livestock to the next pasture or off the forest. It is acceptable for permittee monitoring to be a stubble height for all grass and grass-like species along the greenline, not specific to key hydric species. This will ensure that:

a. In-season conditions are being looked at on the ground to reduce the potential for negative impacts;
b. Information from these field observations can be incorporated into out-year grazing management (i.e. adaptive management); and
c. Notice is provided for Forest Service personnel to complete timely mid-season pasture or end of season streambank alteration monitoring, if necessary or required.

2. For those pastures without ESA listed fish spawning, but have designated critical habitat, the FS will conduct at a minimum ocular monitoring mid-season once every 3-5 years on a rotating basis.
3. Trained personnel will complete end of season streambank alteration monitoring using MIM protocol within one week or as soon as possible of livestock being moved. Results will be summarized along with ocular/qualitative utilization observations shared by permittees into a year-end annual monitoring report to be shared with the Services.
4. Lessons learned from the combined efforts of move triggers followed by permittees and end-point streambank alteration and residual stubble height monitoring will be the driver of adaptive management changes in grazing prescriptions.

Key areas are a monitoring point for grazing use. It is assumed that key areas, when properly selected, reflect the overall acceptability of current management over the range and serve as an indicative sample of range conditions, trend or degree of use.

A DMA is a permanently marked segment of a stream at least 110 m long that has been selected for monitoring and established by an interdisciplinary team of highly experienced personnel with knowledge of the management area.

<u>Adaptive Management Strategy</u>

The WWNF will use the following adaptive management steps to adjust grazing management for specific pastures, both over the long term (3–5 years) and annually, if needed to minimize the impact of livestock on streams. The annual adaptive management strategy describes how the WWNF will adjust grazing management annually, if needed, to ensure annual use indicators are met. The long-term strategy describes how the WWNF will use effectiveness monitoring results to adjust grazing management to meet aquatic and riparian desired conditions.

Annual Adaptive Management Strategy

a. Monitor annual use indicators as required by the BA and Opinion.
b. Were the annual use indicators met?
    - Yes: Continue current management and monitoring (short and long term) to continue to determine if desired condition is being achieved.
    - No: Determine why the annual use indicator was not met. Was the failure due to causes outside the permittee's control (e.g., a grazing design problem, a changed condition outside the control of the permittee, or annual use indicator was not appropriate)? [An inappropriate annual use indicator is an indicator that is not the first attribute that might show excessive livestock impacts. In this situation, changing to a more appropriate indicator will help achieve or maintain desired conditions.]
        - Yes: Were there any effects to riparian and stream conditions? Develop a plan with permittee, fisheries biologist, and rangeland management specialist for the next year's grazing to respond to the cause (e.g., bad design, inappropriate use indicator, etc.) and/or effects to the resource.

    - No: Determine if any effects occurred to the stream conditions. Discuss with the permittee why the annual use indicator standard was not met and develop a plan (adaptive management) to be implemented the following year to correct grazing management in order to meet the annual use indicator standard. Change grazing management as needed if long-term effects to riparian and aquatic conditions occurred.
  - Yes: Continue current management and monitoring (short and long) to continue to determine if desired condition is being achieved and direction from consultation will be met.
  - No: Determine why the end of season indicator was not met. Was the failure due to causes outside the permittee's control (for example; a grazing design problem, a changed condition outside the control of the permittee, or annual use indicator was not appropriate)? An inappropriate end of season indicator is an indicator that is not the first attribute that might show excessive livestock impacts. In this situation, changing to a more appropriate indicator will help achieve or maintain desired conditions. Review/analyze current vs. desired condition and trend.
    - Yes: Were there any effects to the resource? Develop a plan with permittee, fisheries biologist and rangeland management specialist for the next year's grazing to respond to the cause (e.g. bad design, inappropriate use indicator, etc.) and/or effects to the resource.
    - No: Determine if any effects occurred to the resource. Discuss with the permittee why the standard was not met and develop a plan (adaptive management) to be implemented the following year to correct the management to meet the standard. Change management as needed if long-term affects occurred.

c. Contact the Line officer with a recommendation for change(s) to occur for the next grazing season. Line officer will work with biologist and rangeland management specialist in making an assessment if effects to riparian and stream conditions are outside what was described and anticipated in this consultation.
d. Line Officer contacts the Services.

Long-Term Adaptive Management Strategy

a. Determine current aquatic and riparian conditions using MIM trend data and local knowledge of results captured in the annual monitoring reports.
b. Compare current aquatic and riparian conditions to desired conditions as described in the Forest Plan.
c. Are Forest Plan aquatic and riparian desired conditions met on the Allotment?
  - Yes: Continue management as prescribed allowing for annual changes as needed to ensure annual use indicators described in the BA and this Opinion are met.
  - No: Are livestock the limiting factor (annual use indicators are not being met and/or are ineffective) and is the trend in habitat conditions downward or static?
    - No: Provide information to the appropriate Line Officer who then contacts the Services. Continue monitoring.
    - Yes: Provide information to the Line Officer who then works with the resource specialists in making an assessment of effects of grazing on aquatic and riparian conditions. Develop changes to the grazing strategy to reduce livestock use and effects to riparian areas in the pasture.
    - The Line Officer contacts the Services to inform the Services of changes to grazing management on the Allotment and to determine if consultation reinitiation is required.

ESA-Listed Fish Species

SR steelhead, listed as Threatened under the ESA, is the only ESA-listed fish species in the analysis area for the CERA project. Habitat for SR steelhead is present on the Cold Springs and Teepee Elk allotments (Table 21).

Table 21. SR steelhead and critical habitat present in CERA allotments.

Allotment	SR Steelhead	SR Steelhead Designated Critical Habitat
Cold Springs	Present	Present
Lost Cow	Not Present	Not Present
Teepee Elk	Present	Present

Snake River Steelhead (Threatened)

SR steelhead were listed by the National Marine Fisheries Service (NMFS) as threatened under the federal ESA on March 25, 1999 (64 FR 15417). SR steelhead are widely distributed in the analysis area (Figure 10). Potential habitat surveys were conducted on a number of streams in the analysis area where there was doubt of the previously mapped distribution of steelhead (See Appendix F).

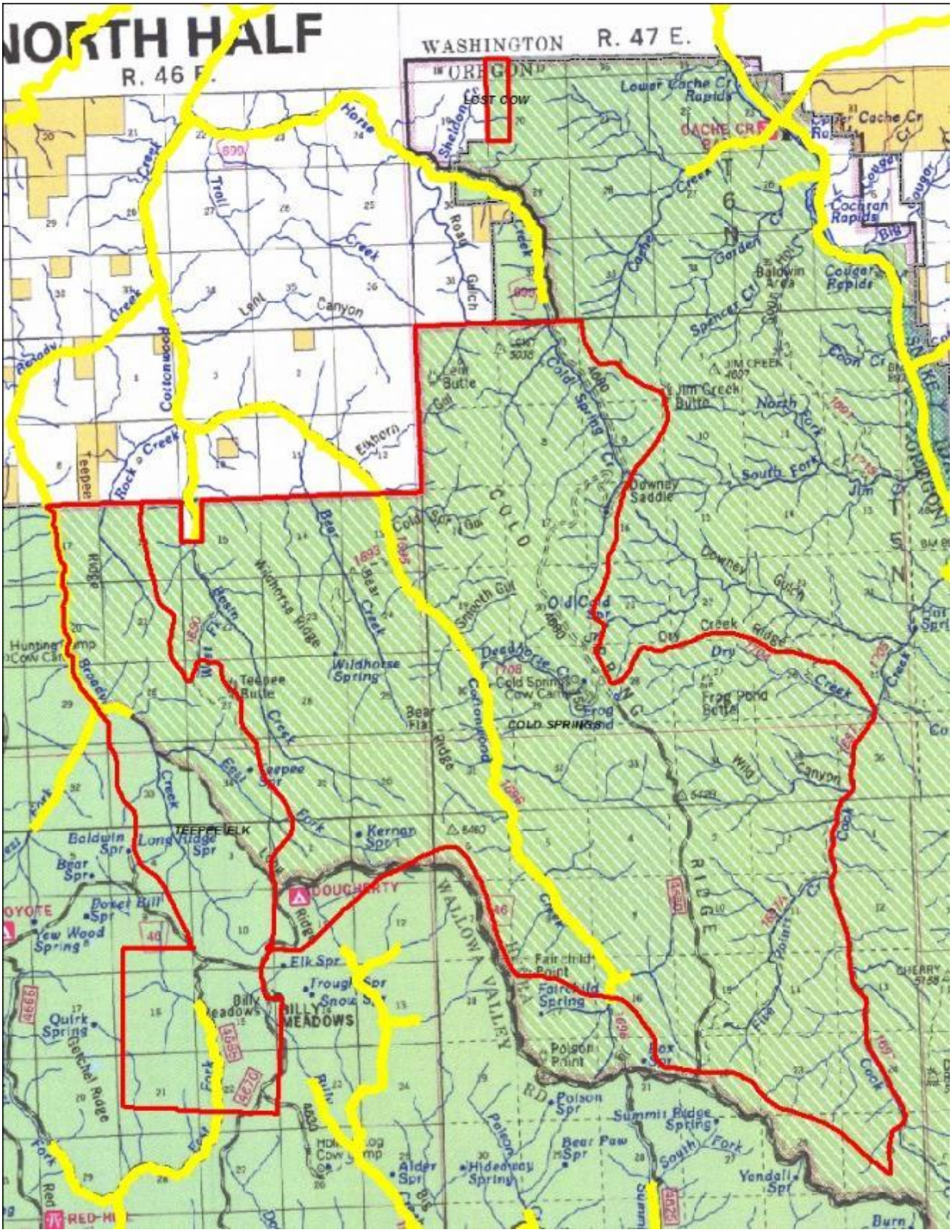

Figure 10. Distribution of SR steelhead (yellow lines) in the analysis area for the Cold Elk RA (red polygon).

Life History

Steelhead trout are the anadromous form of *Oncorhynchus mykiss*. Adult summer steelhead migrate from the ocean to freshwater from June through September. Adults overwinter in large rivers while sexually maturing. Adults resume migration to spawning streams in early spring the following year. Spawning generally takes place from March through May. Eggs incubate during the spring and emergence occurs from June through July depending on water temperatures. Juveniles typically spend two to three years in freshwater. Juvenile steelhead generally utilize habitats with higher water velocities than juvenile Chinook salmon. In winter, juvenile steelhead utilize deep pools with abundant cover. Juvenile steelhead may reside in their natal stream for their entire freshwater rearing phase or may migrate to other streams within a watershed. Smoltification occurs during late winter and juvenile steelhead emigrate to the ocean during spring, normally in their second year. Smoltification is the process where juvenile salmonids undergo physiological, morphological and behavioral changes that enable them to live in salt water environments. Summer steelhead populations in the Grande Ronde and Imnaha river systems normally spend 1 to 2 years maturing in the ocean.

Abundance

ODFW has been monitoring adult steelhead escapement to the Joseph Subbasin since 2012. From 2012 to 2017 the mean estimated escapement was 2,053 adult steelhead (Table 22).

Table 22. Escapement estimates for steelhead for the Joseph Creek Subbasin. Data Sources: ODFW Technical Reports

Year	Total Escapement for Joseph Subbasin
2017	1,610
2016	1,663
2015	2,967
2014	2,522
2013	2,197
2012	1,357
Mean	**2,053**

Distribution

Within the Joseph Creek Subbasin, the CERA analysis area provides about 10.1 miles of spawning and rearing habitat for SR steelhead which represents about 4.4% of the total spawning and rearing habitat available in the Joseph Creek Subbasin (Table 23).

Table 23. Miles of habitat for SR steelhead by allotment in the Cold Elk Range Analysis.

Allotment	Miles of Migration Habitat	Spawning and Rearing Habitat
Cold Springs	0.0	7.4
Lost Cow	0.0	0.0
Teepee Elk	0.0	2.7
Total	**0.0**	**10.1**

Critical Habitat Status and Description

Critical habitat was designated for the SR steelhead DPS on February 16, 2000 (65 FR 7764) and revised on September 2, 2005 (70 FR 52808). There are about 10.4 miles of critical habitat for SR steelhead on NFS lands in the analysis area (Table 24).

Table 24. Miles of steelhead critical habitat by allotment in the Cold Elk RA analysis area.

Allotment	Miles of Critical Habitat
Cold Springs	7.4
Lost Cow	0.0
Teepee Elk	2.7
Total	**10.1**

Direct Effects

The following is a site-specific analysis of the potential direct effects to ESA-listed fish species. This analysis uses the best available scientific information, site-specific information, and professional judgment to determine potential effects of the proposed action for each allotment.

Livestock grazing can result in direct effects to salmonids when livestock disturb redds that results in death of embryos. Strategies for avoiding direct effects to SR steelhead from livestock grazing include: 1) avoid grazing adjacent to spawning habitat during the spawning and emergence period where spawning habitat is accessible to livestock; 2) relying on natural features that discourage livestock from accessing spawning habitat; 3) relying on cattle behavioral patterns that result in cattle avoiding spawning habitat during the spawning and emergence period; and 4) fencing of spawning areas.

Spawning and emergence periods for species differ across the Wallowa Mountains Zone due to the influence of elevation on stream temperature regimes. Generally, for streams in the Cold Springs and Teepee Elk allotments the spawning and emergence period is from March 15 to July 1 (Table 25).

Table 25. Spawning and emergence periods for ESA-listed fish species in the CERA analysis area.

Allotment	Species		
	Steelhead	**Spring Chinook**	**Bull Trout**
Cold Springs	March 15 – July 1	N/P	N/P
Lost Cow	N/P	N/P	N/P
Teepee Elk	March 15 – July 1	N/P	N/P

N/P = no spawning habitat present

Cold Springs Allotment

The proposed season of use for the Cold Springs Allotment is from June 1 through October 31.

SR Steelhead

There are about 7.4 miles of spawning habitat for steelhead on the Cold Springs Allotment. Cottonwood Creek provides all of the spawning habitat for SR steelhead on the allotment. The majority of Cottonwood Creek experienced a high severity stand replacement burn during the 1988 Teepee Butte Fire. A large debris flow event occurred on Cottonwood Creek in the spring of 2017. The channel was incised up to 4 feet and riparian shrubs were damaged. The event was triggered by a high intensity rainstorm.

Cottonwood Creek is characterized as a moderately steep Rosgen B-4 channel type in the Lower and Upper Cottonwood pastures. The floodplain and riparian areas are narrow with limited access to the stream by cattle due to the adjacent steep side slopes. Cattle access points are generally a few side draws with relatively gentle slopes such as Deadhorse Creek.

There is a low risk that spawning steelhead or redds will be disturbed in Cottonwood Creek on the Cold Springs Allotment where grazing occurs prior to July 1 in pastures that do not contain Cottonwood Creek (Table 26). While these pastures are generally not fenced, topography, distance to water, and distance to suitable rangeland limits the potential for cattle to access Cottonwood Creek (See Appendix E). Additional mitigating factors are: 1) cattle typically avoid riparian areas characterized by wet soil and cold temperatures during the early spring grazing period (Platts and Nelson 1985, Kovalchik and Elmore 1991); and 2) cattle concentrate their foraging effort in uplands rather than riparian areas during the early spring grazing period because of low forage palatability in riparian areas (Platts and Nelson 1985, DelCurto et al. 2000). Construction of proposed fencing to limit access to Cottonwood Creek from upland pastures would reduce the potential for unscheduled use prior to July 1.

Three pastures on the allotment contain portions of Cottonwood Creek (Lower Cottonwood, Upper Cottonwood, South Wildhorse). Grazing South Wildhorse pasture prior to July 1 is a low risk of disturbance of redds. Adequate upland water and ridgetop grazing areas are present in the South Wildhorse pasture. Distance to water and suitable rangeland limits the potential for cattle to access Cottonwood Creek from ridgetop areas in the South Wildhorse pasture.

Grazing the Upper Cottonwood pasture prior to July 1 is not recommended due to 1) the lack of upland water sources in suitable rangeland on ridgetops, 2) the presence of a trail from suitable rangeland on ridgetop on the westside of the pasture.

Grazing of the Lower Cottonwood pasture prior to July is not recommended. The majority of the pasture is within the Cottonwood Canyon and lacks upland water sources. The majority of the suitable rangeland in the pasture is located on a ridgetop flat in the southeast corner of the pasture. This area could be grazed prior to July 1 because there is little chance that cattle would drift down into the canyon due to the terrain.

Table 26. Cold Springs Allotment pasture use summary to avoid direct effects to steelhead.

Pasture	Stream	Spawning Habitat Present	Use Period*	Comments
Lower Cottonwood	Cottonwood Cr	Yes	> July 1	Limited ridgetop grazing area present in the southeastern corner of pasture. The rest of the pasture is hillside and valley bottom.
Upper Cottonwood	Cottonwood Cr	Yes	> July 1	Majority of grazeable area in the pasture is adjacent to Cottonwood Creek.
Horse Creek	Horse Cr	No	No restrictions	Spawning habitat not present.
North Cold Springs	Horse Cr	No	No restrictions	Spawning habitat not present.
Lower Bear	Bear Creek	No	No restrictions	Spawning habitat not present.
Lower Basin	Basin Creek	No	No restrictions	Spawning habitat not present.
North Wildhorse	Bear Creek	No	No restrictions	Spawning habitat not present.
South Wildhorse	Cottonwood Creek	Yes	No restrictions	Limited accessibility to spawning habitat. Impacts to steelhead spawning and habitat are limited due to very steep topography.
	E.F. Broady	No	No restrictions	Spawning habitat not present.
South Cold Springs	None	No	No restrictions	Spawning habitat not present. Construct fencing to prevent cattle from accessing Cottonwood Creek from the Howard Cutoff Trail and down E.F. Cottonwood Creek.
Cook Creek	Cook Creek	No	No restrictions	Spawning habitat not present.
Beef Pasture	Deadhorse Creek	No	No restrictions	Spawning habitat not present. Construct fence to keep cattle from using the Deadhorse Trail to access Cottonwood Creek.
Cow Camp	None	No	No restrictions	Spawning habitat not present. Construct fence to keep cattle from using the Deadhorse Trail to access Cottonwood Creek.
Horse Pasture	None	No	No restrictions	Spawning habitat not present. Construct fence to keep cattle from using the Deadhorse Trail to access Cottonwood Creek.
Road Holding Pasture	None	No	No restrictions	Spawning habitat not present.

*<=before, >=after

Teepee Elk Allotment

The proposed season of use for the Teepee Elk Allotment is from June 1 through October 31.

SR Steelhead

There are about 2.7 miles of spawning habitat for steelhead on the Teepee Elk Allotment. E.F. Peavine Creek and Broady Creek provide spawning habitat for SR steelhead on the allotment. Currently the Elk pasture is grazed after July 1 to avoid impacts to redds in E.F. Peavine Creek. Under the proposed action, the Elk pasture could be grazed prior to July 1 once the riparian exclosure has been constructed.

There is a low risk that spawning steelhead or redds will be disturbed in Broady Creek on the Teepee Elk Allotment where grazing occurs prior to July 1 (Table 27). Both the Rock Creek and Long Ridge pastures contain portions of Broady Creek which provides steelhead spawning habitat. Broady Creek is located in a steep narrow canyon and the majority of the stream gradient is greater than 4%.

Majority of grazing areas in these pastures are located on adjacent hillsides or ridgetop flats. Cattle typically avoid riparian areas characterized by wet soil and cold temperatures during the early spring grazing period (Platts and Nelson 1985, Kovalchik and Elmore 1991) and concentrate their foraging effort in uplands rather than riparian areas during the early spring grazing period because of low forage palatability in riparian areas (Platts and Nelson 1985, DelCurto et al. 2000). The accessibility analysis indicated that there was a low risk that cattle would access the portions of Broady Creek with spawning habitat (Appendix E). Thus, there is a low risk of livestock disturbing redds when these pastures are grazed prior to July 1. Construction of the proposed exclosure and reconstruction of the existing exclosure on E.F. Peavine Creek would greatly reduce the risk of cattle disturbing redds prior to July 1 in the Elk pasture.

Table 27. Teepee Elk Allotment pasture use summary to avoid direct effects to steelhead.

Pasture	Stream	Spawning Habitat Present	Use Period*	Comments
Elk	E.F. Peavine Cr	Yes	No restrictions*	Spawning habitat is accessible. Impacts to steelhead spawning and habitat are avoided by construction of an exclosure. *Prior to construction of the exclosure, grazing > July 1
Rock Creek	Broady Creek	Yes	No restrictions	Spawning habitat generally not accessible.
Long Ridge	Broady Creek	Yes	No restrictions	Spawning habitat generally not accessible.
Holding Pasture	E.F. Broady Creek	No	No restrictions	Spawning habitat not present.

*<=before, >=after

Indirect Effects

Evaluation of indirect effects is based on current habitat conditions and the Matrix of Pathways and Indicators as described in *Making Endangered Species Act Determinations of effect for Individual or Grouped Actions at the Watershed Scale (*NMFS 1996).

The following analysis focuses on matrix indicators that have the potential to be affected by grazing and related activities proposed for the CERA. These are: 1) Temperature, 2) Sediment/Turbidity/Substrate, 3) Width/Depth Ratio, 4) Streambank Condition, and 5) Riparian Conservation Area indicators.

The potential indirect effects that livestock grazing may have on matrix indicators are discussed below. This discussion is based on professional judgment along with site specific knowledge of the project area, past monitoring results, stream habitat survey data, and temperature data, where available.

Cold Springs Allotment

There are about 7.4 miles of spawning and rearing habitat for steelhead on the Cold Springs Allotment. All of the habitat is in Cottonwood Creek. The environmental baseline for the subwatersheds encompassing the Cold Springs Allotment are rated overall as "Functioning at Risk" (Table 28).

Table 28. Multi-Species matrix of pathways and indicators for the Cold Springs Allotment. Lower Cottonwood Creek, Broady Creek SWS, Middle Chesnimnus Creek SWS, Upper Cottonwood Creek SWS, Horse Creek SWS, and Cook Creek SWS.

Diagnostic or Pathway	Properly Functioning/ Functioning Appropriately	Functioning At Risk	Not Properly Functioning/ Functioning At Unacceptable Risk
Water Quality:			
Temperature - Chinook, Steelhead		**X**	
Sediment/Turbidity Substrate Embeddedness.	**X**		
Chem. Contamination Nutrients	**X**		
Habitat Access:			
Physical Barriers	**X**		
Habitat Elements:			
Large Woody Material		**X**	
Pool Frequency		**X**	
Pool Quality/Large Pools		**X**	
Off-channel Habitat	**X**		
Refugia	**X**		
Channel Condition and Dynamics:			
Width/Depth Ratio		**X**	
Streambank Condition	**X**		
Floodplain Connectivity		**X**	
Watershed Conditions:			
Road, Density, Location, Drainage	**X**		
Disturbance History Peak Base Flows	**X**		
Riparian Habitat Conservation Areas	**X**		
Disturbance Regime		**X**	
Integration Species & Habitat Conditions		**X**	

Temperature

Cottonwood Creek provides all of the spawning and rearing habitat for steelhead on the Cold Springs Allotment. NMFS considers water temperatures from 50 – 57°F (max 7-day average) to be properly functioning for steelhead and salmon.

Water temperature has been monitored in lower Cottonwood Creek (2015-2018) and upper Cottonwood Creek (2017-2018). Both upper and lower Cottonwood Creek regularly exceed 57°F during the height of summer. Stream shading was greatly reduced following the 1988 Teepee Butte Fire for much of Cottonwood Creek on FS lands. A natural debris flow event occurred in the spring of 2017 along the lower half of Cottonwood Creek resulted in a reduction in shading. The Temperature indicator is currently functioning at risk.

Current grazing is having little effect to riparian shrubs along Cottonwood Creek based on observations made during the 2017 PFC assessment: 1) the riparian area was dominated by hardwoods that were established following the 1988 Teepee Butte Fire, 2), multiple age classes of shrubs are present though large mature shrubs were not present, and 3) minor amounts of livestock browsing was

noted. Analysis of the MIMs data for Cottonwood Creek indicates that the greenline is late seral thus meeting the desired condition for riparian areas with regards to livestock grazing.

Grazing related increases in water temperature is usually related to damage to riparian shrubs adjacent to streams. The Cold Springs Allotment would be grazed in a manner to limit herbivory on shrubs to ≤ 40 percent (as measured by the MIM protocol). This threshold is considered to be "light" use and has been shown to limit impacts to riparian shrubs from livestock grazing while allowing recovery and maintenance of riparian shrubs.

A second grazing effect on water temperature can occur where stream morphology is altered by damage to streambanks resulting in widening of stream channels. Current grazing is having little effect on channel morphology of Cottonwood Creek based on results from the PFC assessment, MIMs, and professional judgement.

Based on current conditions the proposed action will have little effect on water temperatures of Cottonwood Creek. The riparian shrub community is recovering from previous disturbance events, the stream channel is not overly widened, and current grazing is having little impact to riparian shrubs and streambanks. There is a low risk of effects to the temperature indicator.

Sediment/Turbidity/Substrate Embeddedness

NMFS considers < 12% fines (<0.85mm) in gravel, turbidity low; dominant substrate is gravel or cobble (interstitial spaces clear), or embeddedness <20% to be properly functioning for steelhead and salmon. The Sediment/Turbidity/Substrate Embeddedness indicators are currently properly functioning compared to Matrix criteria. Fine sediment levels in Cottonwood Creek are low based on data from PIBO monitoring, the 2016 PFC assessment and the 2015 stream survey. The 2016 MIMs data indicates that fine sediment levels are higher at the upper DMA compared to the lower DMA.

Fine sediments levels are meeting objectives along Cottonwood Creek. The Howard Trail crossing, located upstream of the upper DMA, is an area of localized fine sediment due to bank alteration by livestock and elk. In lower Cottonwood Creek, streambanks prior to the 2017 debris flow event were stable and meeting objectives. However, streambanks are now generally unstable as a result of the scouring of streambank vegetation during the debris flow event and are likely a source of fine sediment in the near future.

Current grazing is having little affect to fine sediment levels along Cottonwood Creek based on observations made during the 2017 PFC assessment. However, due to the loss of streambank stabilizing vegetation, streambanks along the affected length of the stream are vulnerable to damage by livestock.

Grazing related increases in fine sediment are usually related to damage to streambanks by livestock. The Cold Springs Allotment would be grazed in a manner to limit streambank alteration to ≤ 20 percent (as measured by the MIM protocol). This threshold has been shown to limit impacts to streambanks from livestock grazing while allowing recovery and maintenance of streambanks.

Based on current conditions the proposed action may have moderate effects on fine sediment levels in Cottonwood Creek where livestock disturb weakened streambanks. There is a moderate risk of effects

to the fine sediment indicator. Resting the Lower Cottonwood pasture for a period of 5 years would allow recovery of streambank stabilizing vegetation to occur at a natural rate.

Width/Depth Ratio

NMFS considers width to depth ratios <10 to be properly functioning for steelhead and salmon. Cottonwood Creek was on the upper end of the normal range of width to depth ratios for its Rosgen channel type. The 2017 debris flow event resulted in the incision of Cottonwood Creek. The Width/Depth Ratio indicator is currently functioning at risk compared to Matrix criteria.

Based on professional observation, Cottonwood Creek is meeting the for width-to-depth ratio indicator in the upper reaches. The 2017 debris flow has resulted in channel incision along the lower reaches of the creek resulted in a width/depth ratio lower than desired. This condition will persist for the near future until stream processes develop an appropriate width to depth ratio.

Current grazing is having little effect on width to depth ratios along Cottonwood Creek based on observations made during the 2017 PFC assessment. However, due to the loss of streambank stabilizing vegetation, streambanks along the affected length of the stream are vulnerable to damage by livestock.

Grazing related increases in width-to-depth ratios are usually related to damage to streambanks by livestock. The Cold Springs Allotment would be grazed in a manner to limit streambank alteration to ≤ 20 percent (as measured by the MIM protocol). This threshold has been shown to limit impacts to streambanks from livestock grazing while allowing recovery and maintenance of streambanks.

Based on current conditions the proposed action may have moderate effects on width-to-depth ratios in Cottonwood Creek where livestock disturb weakened streambanks. There is a moderate risk of effects to the width-to-depth ratios indicator. Resting the Lower Cottonwood pasture for a period of 5 years would allow recovery of stabilizing vegetation to occur at a natural rate.

Streambank Condition

NMFS considers >90% stable; i.e., on average, less than 10% of banks are actively eroding to be properly functioning for steelhead and salmon. The Streambank Condition indicator is currently properly functioning.

In general streambanks are stable and meeting objectives for both stability and bank cover along upper Cottonwood Creek. The Howard Trail crossing, located upstream of the upper DMA, is an area of localized fine sediment due to bank alteration by livestock and elk. Bank stability prior to the 2017 debris flow event were stable and meeting objectives. However, streambanks are now generally unstable along lower Cottonwood Creek as a result of the scouring of streambank vegetation during the debris flow event.

Grazing related decreases in streambank stability is usually related to damage (mechanical and vegetation) to streambanks by livestock. The Cold Springs Allotment would be grazed in a manner to limit streambank alteration to ≤ 20 percent and a residual stubble height of ≥ 4 inches (as measured by the MIM protocol). These thresholds have been shown to limit impacts to streambanks from livestock grazing while allowing recovery and maintenance of streambanks.

Based on current conditions the proposed action may have moderate effects on streambank conditions in Cottonwood Creek where livestock disturb weakened streambanks. There is a moderate risk of effects to the streambank conditions indicator. Resting the Lower Cottonwood pasture for a period of 5 years would allow recovery of stabilizing vegetation to occur at a natural rate.

Riparian Habitat Conservation Areas

NMFS considers riparian areas to be properly functioning when the riparian reserve system provides adequate shade, large woody debris recruitment, and habitat protection and connectivity in all subwatersheds, and buffers or includes known refugia for sensitive aquatic species (>80% intact), and/or for grazing impacts: percent similarity of riparian vegetation to the potential natural community/composition >50%. The Riparian Habitat Conservation Areas indicator is currently properly functioning compared to Matrix criteria. There have been few management activities that have occurred within the RHCA adjacent to Cottonwood Creek. These have been limited to grazing, trail construction and fire suppression activities.

Current grazing is having little effect to riparian communities along Cottonwood Creek based on observations made during the 2016 PFC survey: 1) the riparian area is recovering from the effects of the 1988 Teepee Butte Fire, 2) multiple age classes of shrubs are present, and 3) minor amounts of livestock browsing was noted. Analysis of the MIMs data for Cottonwood Creek indicates that the riparian area is late seral thus meeting the desired condition for riparian areas with regards to livestock grazing.

Riparian areas on the Cold Springs Allotment are generally in good condition overall. Under the prosed action grazing will be managed to meet objectives for annual and long-term indicators thus allowing for the attainment of PACFISH riparian goals. There is a low risk of effects to the riparian habitat conservation area indicator.

Summary of Indirect Effects to Matrix Indicators

There is moderate risk of effects to Matrix habitat indicators that have the potential to be affected by grazing and related activities proposed for the Cold Springs Allotment (Table 29). These are: 1) Sediment/Turbidity/Substrate, 2) Width/Depth Ratio, and 3) Streambank Condition indicators. There is a low risk of effects to the Temperature, and Riparian Conservation Area indicators.

Table 29. Risk of effects to habitat indicators for ESA-listed fish species, Cold Springs Allotment.

Risk of Indirect Effects to Each Matrix Indicator *														
Temp	**Sed**	**Chem Cont**	**Phys Barr**	**LWM**	**Pool Freq / Qual**	**Off-Chan**	**Refugia**	**W/D**	**Bank Stab**	**Flood plain**	**Road Dens**	**Disturb Hist / Flows**	**RHCA**	**Disturb Regime**
L	M	N	N	N	N	N	N	M	M	N	N	N	L	N

*P =Positive Effect, N=No Risk, L =Low Risk, M=Moderate Risk, H=High Risk

Teepee Elk Allotment

There are about 2.7 miles of steelhead habitat on the Teepee Elk Allotment. The environmental baseline for the subwatersheds encompassing the Teepee Elk Allotment are rated overall as "Functioning at Risk" (Table 30).

Table 30. Multi-Species matrix of pathways and indicators for the Teepee Elk Allotment. Lower Cottonwood Creek SWS, Broady Creek SWS, Peavine Creek SWS, and Middle Chesnimnus Creek SWS.

Diagnostic or Pathway	Properly Functioning/ Functioning Appropriately	Functioning At Risk	Not Properly Functioning/ Functioning At Unacceptable Risk
Water Quality:			
Temperature - Chinook, Steelhead		**X**	
Sediment/Turbidity Substrate Embeddedness.		**X**	
Chem. Contamination Nutrients	**X**		
Habitat Access:			
Physical Barriers	**X**		
Habitat Elements:			
Large Woody Material	**X**		
Pool Frequency		**X**	
Pool Quality/Large Pools		**X**	
Off-channel Habitat		**X**	
Refugia		**X**	
Channel Condition and Dynamics:			
Width/Depth Ratio	**X**		
Streambank Condition	**X**		
Floodplain Connectivity		**X**	
Watershed Conditions:			
Road, Density, Location, Drainage		**X**	
Disturbance History Peak Base Flows		**X**	
Riparian Habitat Conservation Areas		**X**	
Disturbance Regime		**X**	
Integration Species & Habitat Conditions		**X**	

Temperature

Broady Creek and E.F. Peavine Creek provide spawning and rearing habitat for SR steelhead on the Teepee Elk Allotment. NMFS considers water temperatures from 50 – 57°F (max 7-day average) to be properly functioning for steelhead and salmon. Broady Creek regularly meets NMFS properly functioning criteria. E.F. Peavine Creek on the Teepee Elk Allotment regularly dries up during the summer months.

Grazing related increases in water temperature is usually related to damage to riparian shrubs adjacent to streams. The Teepee Elk Allotment would be grazed in a manner to limit herbivory on shrubs to ≤ 40 percent (as measured by the MIM protocol). This threshold has been shown to limit impacts to riparian shrubs from livestock grazing while allowing recovery and maintenance of riparian shrubs.

A second grazing effect on water temperature can occur where stream morphology is altered by damage to streambanks resulting in widening of stream channels. Current grazing is having little effect on channel morphology of Broady Creek based on results from the PFC assessment, MIMs, and professional judgement.

Grazing related increases in width-to-depth ratios are usually related to damage to streambanks by livestock. The Teepee Elk Allotment would be grazed in a manner to limit streambank alteration to ≤ 20 percent (as measured by the MIM protocol). This threshold has been shown to limit impacts to streambanks from livestock grazing while allowing recovery and maintenance of streambanks.

Based on current conditions the proposed action will have little effect on water temperatures of Broady Creek. Broady Creek regularly meets ODEQ standard for water temperature. E.F. Peavine Creek has intermittent flow on the Teepee Elk Allotment and is normally dry by early summer. There is a low risk of effects to the temperature indicator. There is a low risk of effects to the temperature indicator.

Sediment/Turbidity/Substrate Embeddedness

The Sediment/Turbidity/Substrate Embeddedness indicators are currently functioning at risk compared to Matrix criteria.

Both Broady Creek and E.F. Peavine Creek exhibit localized areas of high fine sediment levels. Overall, fine sediment levels in E.F. Peavine Creek are meeting objectives though fine sediment levels (8.5%) at the DMA site are very high (46%). High fine sediment levels at the DMA site appear to be related to high bank alterations levels based on observations made during a site visit in the fall of 2018.

Overall fine sediment levels in Broady Creek are elevated (23.2%) while quite low at the DMA (0%). Based on field observations, moderate to high fine sediment levels in the Broady Creek are likely the result of debris flows from adjacent upland areas that occurred in the mid 2000's and past road failures.

Grazing related increases in fine sediment in streams are usually related to damage to streambanks by livestock. The Teepee Elk Allotment would be grazed in a manner to limit streambank alteration to ≤ 20 percent (as measured by the MIM protocol). This threshold has been shown to limit impacts to streambanks from livestock grazing while allowing recovery and maintenance of streambanks.

Based on current conditions the proposed action will have moderate effect on fine sediment levels in E.F. Peavine Creek on the Teepee Elk Allotment. Cattle appear to be spending more time than desired in the RHCA of E.F. Peavine Creek under the current management plan. There is a moderate risk of effects to the fine sediment indicator.

Construction of an exclosure along E.F. Peavine Creek from the south boundary of the Elk pasture upstream to the existing exclosure and reconstruction of the existing exclosure would significantly reduce the amount of bank alteration along E.F. Peavine Creek. The current practice of delaying use of the Elk pasture until after July 1 is having a detrimental effect on E.F. Peavine Creek especially to streambanks. Constructing the proposed exclosure will have a positive effect to the Sediment indicator.

Width/Depth Ratio

The Width/Depth Ratio indicator is currently functioning at risk compared to Matrix criteria. However, both Broady Creek and E.F. Peavine Creek are within the normal ranges for their respective Rosgen channel types.

Grazing related increases in width-to-depth ratios are usually related to damage to streambanks by livestock. The Teepee Elk Allotment would be grazed in a manner to limit streambank alteration to ≤

20 percent (as measured by the MIM protocol). This threshold has been shown to limit impacts to streambanks from livestock grazing while allowing recovery and maintenance of streambanks.

Based on current conditions the proposed action will have moderate effect on width to depth ratios in E.F. Peavine Creek on the Teepee Elk Allotment. Cattle appear to be spending more time than desired in the RHCA of E.F. Peavine Creek under the current management plan. There is a moderate risk of effects to the width to depth ratio indicator.

Construction of an exclosure along E.F. Peavine Creek from the south boundary of the Elk pasture upstream to the existing exclosure and reconstruction of the existing exclosure would significantly reduce the amount of bank alteration along E.F. Peavine Creek. The current practice of delaying use of the Elk pasture until after July 1 is having a detrimental effect on E.F. Peavine Creek especially to streambanks. Constructing the proposed exclosure will have a positive effect to the Width to Depth indicator.

Streambank Condition

The Streambank Condition indicator is currently properly functioning compared to Matrix criteria for Broady Creek and functioning at risk E.F. Peavine Creek. Overall, the stream survey data indicates that E.F. Peavine Creek is meeting the RMO for streambank stability however the MIM data shows that streambanks stability is not meeting the RMO at the DMA site. Based on a site visit, the MIM data represents the condition of streambanks of E.F. Peavine Creek in the Elk pasture of the Teepee Elk Allotment.

Grazing related decreases in streambank stability are usually related to damage (mechanical and vegetation) to streambanks by livestock. The Teepee Elk Allotment would be grazed in a manner to limit streambank alteration to $\leq$ 20 percent and a residual stubble height of $\geq$ 4 inches (Broady Creek) or $\geq$ 6 inches (E.F. Peavine Creek) as measured by the MIM protocol. These thresholds have been shown to limit impacts to streambanks from livestock grazing while allowing recovery and maintenance of streambanks.

Based on current conditions the proposed action will have moderate effect on streambank condition in streams on the Teepee Elk Allotment. Cattle appear to be spending more time than desired in the RHCA of E.F. Peavine Creek under the current management plan. There is a moderate risk of effects to the streambank indicator.

Construction of an exclosure along E.F. Peavine Creek from the south boundary of the Elk pasture upstream to the existing exclosure and reconstruction of the existing exclosure would significantly reduce the amount of bank alteration along E.F. Peavine Creek. The current practice of delaying use of the Elk pasture until after July 1 is having a detrimental effect on E.F. Peavine Creek especially to streambanks. Constructing the proposed exclosure will have a positive effect to the Streambank indicator.

Riparian Habitat Conservation Areas

The Riparian Habitat Conservation Areas indicator is current functioning at risk compared to Matrix criteria. RHCAs on the Teepee Elk Allotment have been impacted by past timber harvest and road construction activities.

Current grazing is having moderate effects to the RHCA along E.F. Peavine Creek on the Teepee Elk Allotment based on observations made during site a visit in the fall of 2018. The impacts stem from annual use of the Elk pasture during the mid and late seasons that result in excessive use of riparian areas.

Riparian areas on the Teepee Elk Allotment have been altered in response to logging, road construction, and grazing activities. Under the prosed action grazing will be managed to meet objectives for annual and long-term indicators thus allowing for the attainment of PACFISH riparian goals. There is a moderate risk of effects to the riparian habitat conservation area indicator.

Construction of an exclosure along E.F. Peavine Creek from the south boundary of the Elk pasture upstream to the existing exclosure and reconstruction of the existing exclosure would significantly reduce the cattle use along E.F. Peavine Creek. The current practice of delaying use of the Elk pasture until after July 1 is having a detrimental effect on the riparian area of E.F. Peavine Creek. Constructing the proposed exclosure will have a positive effect to the RHCA indicator.

Summary of Indirect Effects to Matrix Indicators

There is low and moderate risk of effects to Matrix habitat indicators that have the potential to be affected by grazing and related activities proposed for the Teepee Elk Allotment (Table 31). These are: 1) Temperature, 2) Sediment/Turbidity/Substrate, 3) Width/Depth Ratio, 4) Streambank Condition, and 5) Riparian Conservation Area indicators.

Table 31. Risk of effects to habitat indicators for ESA-listed fish species, Teepee Elk Allotment.

Risk of Indirect Effects to Each Matrix Indicator *														
Temp	**Sed**	**Chem Cont**	**Phys Barr**	**LWM**	**Pool Freq / Qual**	**Off-Chan**	**Refugia**	**W/D**	**Bank Stab**	**Flood plain**	**Road Dens**	**Disturb Hist / Flows**	**RHCA**	**Disturb Regime**
L	M	N	N	N	N	N	N	M	M	N	N	N	M	N

*P =Positive Effect, N=No Risk, L =Low Risk, M=Moderate Risk, H=High Risk

Interrelated/Interdependent Effects

Interrelated actions are actions that "are part of a larger action and depend on the larger action for their justification" (50 CFR§402.02). The Forest has not identified any interrelated actions associated with the proposed action.

Interdependent actions are actions that have "no independent utility apart from the action under consideration" (50 CFR§402.02). The Forest has not identified any interdependent actions associated with the proposed action. There are activities associated with the proposed action that could potentially affect fish and could be considered interdependent actions. These include livestock grazing and other agriculture activities on private property that is owned by the permittees and diverting water from streams on private and/or NFS lands for agricultural purposes. However, we believe that these activities would continue to occur in a manner similar to the way they are currently occurring whether or not livestock graze on the two allotments. Therefore, these activities are not considered to be interdependent actions.

Direct and Indirect Effects to Critical Habitat

SR Steelhead

Cold Springs Allotment

There are about 7.4 miles of critical habitat for steelhead on the Cold Springs Allotment.

***Steelhead PBF 1*:** Spawning Sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development.

Substrate - Sediment/Turbidity/Substrate Embeddedness indicator: Fine sediment levels in Cottonwood Creek are low based on data from PIBO monitoring, the 2016 PFC assessment and the 2015 stream survey. The 2016 MIMs data indicates that fine sediment levels are higher at the upper DMA compared to the lower DMA.

In general streambanks are stable and meeting objectives for both stability and bank cover along upper Cottonwood Creek. The Howard Trail crossing, located upstream of the upper DMA, is an area of localized fine sediment due to bank alteration by livestock and elk. Bank stability prior to the 2017 debris flow event were stable and meeting objectives. However, streambanks are now generally unstable as a result of the scouring of streambank vegetation during the debris flow event.

Current grazing is having little affect to fine sediment levels along Cottonwood Creek based on observations made during the 2017 PFC assessment. However, due to the loss of streambank stabilizing vegetation streambanks along the affected length of the stream are vulnerable to damage by livestock.

Grazing related increases in fine sediment are usually related to damage to streambanks by livestock. The Cold Springs Allotment would be grazed in a manner to limit streambank alteration to ≤ 20 percent (as measured by the MIM protocol). This threshold has been shown to limit impacts to streambanks from livestock grazing while allowing recovery and maintenance of streambanks.

Based on current conditions the proposed action may have moderate effects on fine sediment levels in Cottonwood Creek where livestock disturb weakened streambanks. There is a moderate risk of effects to the fine sediment indicator. Resting the Lower Cottonwood pasture for a period of 5 years would allow recovery of stabilizing vegetation to occur at a natural rate.

Water Quality -Temperature, Sediment/Turbidity/Substrate Embeddedness, and Chemical Contamination and Nutrients indicators: Water temperature has been monitored in lower Cottonwood Creek (2015-2018) and upper Cottonwood Creek (2017-2018). Both upper and lower Cottonwood Creek regularly exceed 57°F during the height of summer. Stream shading was greatly reduced following the 1988 Teepee Butte Fire for much of Cottonwood Creek on FS lands. A natural debris flow event occurred in the spring of 2017 along the lower half of Cottonwood Creek resulted in a reduction in shading. The Temperature indicator is currently functioning at risk.

Current grazing is having little effect to riparian shrubs along Cottonwood Creek based on observations made during the 2017 PFC assessment: 1) the riparian area was dominated by hardwoods that were established following the 1988 Teepee Butte Fire, 2), multiple age classes of shrubs are present though large mature shrubs were not present, and 3) minor amounts of livestock browsing was

noted. Analysis of the MIMs data for Cottonwood Creek indicates that the riparian area is late seral thus meeting the desired condition for riparian areas with regards to livestock grazing.

Grazing related increases in water temperature is usually related to damage to riparian shrubs adjacent to streams. The Cold Springs Allotment would be grazed in a manner to limit herbivory on shrubs to ≤ 40 percent (as measured by the MIM protocol). This threshold is considered to be "light" use and has been shown to limit impacts to riparian shrubs from livestock grazing while allowing recovery and maintenance of riparian shrubs.

Sediment/Turbidity/Substrate Embeddedness indicator is discussed above.

The proposed action will have little impact to the Chemical Contamination and Nutrients indicator. Based on site visits cattle are not present along Cottonwood Creek in sufficient numbers or duration to cause an increase in nutrients through deposition of fecal matter.

Water Quantity - Change in Peak/Base Flows indicator: Proposed grazing on the Cold Springs Allotment would have no effect to the Change in Peak/Base Flows indicator.

***Steelhead PBF 2*:** Rearing Sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.

Floodplain Connectivity - Floodplain Connectivity indicator: Lower Cottonwood Creek was impacted during the 2017 debris flow event that resulted in channel entrenchment and damage to streambank stabilizing vegetation. There is a moderate risk of impacts from livestock grazing in the Lower Cottonwood pasture from cattle disturbing weakened streambanks and recovering streambank vegetation. Resting the Lower Cottonwood pasture would allow for a natural rate of recovery of streambanks and streambank vegetation.

Forage - Temperature and Sediment/Turbidity/Substrate Embeddedness indicators: See PBF 1 discussion.

Natural Cover - Riparian Habitat Conservation Areas, Large Woody Debris, and Pool Quality indicators: The riparian area adjacent to Cottonwood Creek has been recovering since the 1988 Teepee Butte Fire. Current grazing is having little effect to riparian shrubs along Cottonwood Creek based on observations made during the 2017 PFC assessment: 1) the riparian area was dominated by hardwoods that were established following the 1988 Teepee Butte Fire (see Appendix B for photos), 2), multiple age classes of shrubs are present though large mature shrubs were not present, and 3) minor amounts of livestock browsing was noted. Analysis of the MIMs data for Cottonwood Creek indicates that the riparian area is late seral thus meeting the desired condition for riparian areas with regards to livestock grazing.

Current LWD levels are likely in the lower range of the natural range of variability for Cottonwood Creek due to past natural disturbance events. Much of the LWD that resulted from fire-killed trees after the 1988 Teepee Butte Fire was scoured out of the channel along the lower reaches of Cottonwood Creek during the 2017 debris flow event.

Pool quality has been reduced in the lower reaches of Cottonwood Creek as the result of the 2017 debris flow event that scoured the channel.

Water Quality - Temperature, Sediment/Turbidity/Substrate Embeddedness, and Chemical Contamination and Nutrients indicators: See PBF 1 for a discussion of Temperature, Sediment/Turbidity/Substrate Embeddedness indicators. Proposed grazing on the Cold Springs Allotment is unlikely to affect the Chemical Contamination and Nutrients indicator because cattle spend little actual time within the riparian area of Cottonwood Creek.

Water Quantity - Change in Peak/Base Flows indicator: Proposed grazing on the Cold Springs Allotment will have no effect on the Peak/Base Flows indicator.

***Steelhead PBF 3*:** Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

Free of Artificial Obstruction - Physical Barrier indicator: Proposed grazing on the Cold Springs Allotment will have no effect on the Physical Barrier indicator.

Natural Cover - Riparian Habitat Conservation Areas, Large Woody Debris, and Pool Quality indicators: See PBF 1 and 2 discussions.

Water Quality - Temperature, Sediment/Turbidity/Substrate Embeddedness, and Chemical Contamination and Nutrients indicators: See PBF 1 and 2 discussions.

Water Quantity - Change in Peak/Base Flows indicator: See PBF 2 discussions.

***Steelhead PBF Summary*:** Proposed grazing activities on the Cold Springs Allotment may affect steelhead PBF 1, 2, and 3. Effects to PBFs for steelhead critical habitat on the Cold Springs Allotment are expected to be moderate in the Lower Cottonwood pasture due to potential impacts to debris flow damage to the channel and streambank vegetation. Resting the pasture would allow for a natural rate of recovery of Lower Cottonwood Creek and its adjacent riparian area. Effects to PBFs in the Upper Cottonwood pasture are expected to be insignificant.

Teepee Elk Allotment

There are about 2.7 miles of critical habitat for on the Teepee Elk Allotment.

***Steelhead PBF 1*:** Spawning Sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development.

Substrate → Sediment/Turbidity/Substrate Embeddedness indicator: Both Broady Creek and E.F. Peavine Creek exhibit localized areas of high fine sediment levels. Overall, fine sediment levels in E.F. Peavine Creek are meeting objectives though fine sediment levels (8.5%) at the DMA site are very high (46%). High fine sediment levels at the DMA site appear to be related to high bank alterations levels based on observations made during a site visit in the fall of 2018.

Overall fine sediment levels in Broady Creek are elevated (23.2%) while quite low at the DMA (0%). Based on field observations, moderate to high fine sediment levels in the Broady Creek are likely the result of debris flows from adjacent upland areas that occurred in the mid 2000's and past road failures.

Grazing related increases in fine sediment in streams are usually related to damage to streambanks by livestock. The Teepee Elk Allotment would be grazed in a manner to limit streambank alteration to ≤ 20 percent (as measured by the MIM protocol). This threshold has been shown to limit impacts to streambanks from livestock grazing while allowing recovery and maintenance of streambanks.

Based on current conditions the proposed action will have moderate effect on fine sediment levels in E.F. Peavine Creek on the Teepee Elk Allotment. Cattle appear to be spending more time than desired in the RHCA of E.F. Peavine Creek under the current management plan. There is a moderate risk of effects to the fine sediment indicator.

Construction of an exclosure along E.F. Peavine Creek from the south boundary of the Elk pasture upstream to the existing exclosure and reconstruction of the existing exclosure would significantly reduce the amount of bank alteration along E.F. Peavine Creek. The current practice of delaying use of the Elk pasture until after July 1 is having a detrimental effect on E.F. Peavine Creek especially to streambanks. Constructing the proposed exclosure will have a positive effect to the Sediment indicator.

Water Quality → Temperature, Sediment/Turbidity/Substrate Embeddedness, and Chemical Contamination and Nutrients indicators: Broady Creek regularly meets NMFS properly functioning criteria. E.F. Peavine Creek on the Teepee Elk Allotment regularly dries up during the summer months.

Grazing related increases in water temperature is usually related to damage to riparian shrubs adjacent to streams. The Teepee Elk Allotment would be grazed in a manner to limit herbivory on shrubs to ≤ 40 percent (as measured by the MIM protocol). This threshold has been shown to limit impacts to riparian shrubs from livestock grazing while allowing recovery and maintenance of riparian shrubs.

A second grazing effect on water temperature can occur where stream morphology is altered by damage to streambanks resulting in widening of stream channels. Current grazing is having little effect on channel morphology of Broady Creek based on results from the PFC assessment, MIMs, and professional judgement.

Grazing related increases in width-to-depth ratios are usually related to damage to streambanks by livestock. The Teepee Elk Allotment would be grazed in a manner to limit streambank alteration to ≤ 20 percent (as measured by the MIM protocol). This threshold has been shown to limit impacts to streambanks from livestock grazing while allowing recovery and maintenance of streambanks.

Based on current conditions the proposed action will have little effect on water temperatures of Broady Creek. Broady Creek regularly meets ODEQ standard for water temperature. E.F. Peavine Creek has intermittent flow on the Teepee Elk Allotment and is normally dry by early summer. There is a low risk of effects to the temperature indicator. There is a low risk of effects to the temperature indicator.

Water Quantity → Change in Peak/Base Flows indicator: Proposed grazing on the Teepee Elk Allotment would have no effect to the Change in Peak/Base Flows indicator.

***Steelhead PBF 2*:** Rearing Sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.

Floodplain Connectivity → Floodplain Connectivity indicator: Grazing on the Teepee Elk Allotment is not contributing to an increase in entrenchment of Broady Creek and E.F. Peavine Creek.

Forage → Temperature and Sediment/Turbidity/Substrate Embeddedness indicator: See PBF 1 discussion.

Natural Cover → Riparian Habitat Conservation Areas, Large Woody Debris, and Pool Quality indicators: The Riparian Habitat Conservation Areas indicator is current functioning at risk compared to Matrix criteria. RHCAs on the Teepee Elk Allotment have been impacted by past timber harvest and road construction activities.

Current grazing is having moderate effects to the RHCA along E.F. Peavine Creek on the Teepee Elk Allotment based on observations made during site a visit in the fall of 2018. The impacts stem from annual use of the Elk pasture during the mid and late seasons that result in excessive use of riparian areas.

Riparian areas on the Teepee Elk Allotment have been altered in response to logging, road construction, and grazing activities. Under the prosed action grazing will be managed to meet objectives for annual and long-term indicators thus allowing for the attainment of PACFISH riparian goals. There is a moderate risk of effects to the riparian habitat conservation area indicator.

Construction of an exclosure along E.F. Peavine Creek from the south boundary of the Elk pasture upstream to the existing exclosure and reconstruction of the existing exclosure would significantly reduce the cattle use along E.F. Peavine Creek. The current practice of delaying use of the Elk pasture until after July 1 is having a detrimental effect on the riparian area of E.F. Peavine Creek. Constructing the proposed exclosure will have a positive effect to the RHCA indicator.

Current LWD levels are likely in the lower range of the natural range of variability for Broady Creek and E.F. Peavine Creek due to past management activities including timber harvest and road construction.

Pool quality is likely in the lower range of the natural range of variability for Broady Creek and E.F. Peavine Creek due to past management activities including timber harvest and road construction.

Water Quality → Temperature, Sediment/Turbidity/Substrate Embeddedness, and Chemical Contamination and Nutrients indicators: See PBF 1 for a discussion of Temperature, Sediment/Turbidity/Substrate Embeddedness indicators. Proposed grazing on the Teepee Elk Allotment is unlikely to affect the Chemical Contamination and Nutrients indicator because cattle spend little actual time within the riparian area of Broady Creek. Cattle presence in the RHCA of E.F. Peavine Creek is higher than desired however, based on observations made during a site visit in 2018 levels of fecal matter are not at levels that would result in increases in nutrients to E.F. Peavine Creek.

Water Quantity → Change in Peak/Base Flows indicator: Proposed grazing on the Teepee Elk Allotment will have no effect on the Peak/Base Flows indicator.

***Steelhead PBF 3*:** Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

Free of Artificial Obstruction → Physical Barrier indicator: Proposed grazing on the Teepee Elk Allotment will have no effect on the Physical Barrier indicator.

Natural Cover → Riparian Habitat Conservation Areas, Large Woody Debris, and Pool Quality indicators: See PBF 1 and 2 discussions.

Water Quality → Temperature, Sediment/Turbidity/Substrate Embeddedness, and Chemical Contamination and Nutrients indicators: See PBF 1 and 2 discussions.

Water Quantity → Change in Peak/Base Flows indicator: See PBF 2 discussions.

***Steelhead PBF Summary*:** Proposed grazing activities on the Teepee Elk Allotment may affect steelhead PBF 1, 2, and 3. Effects to PBFs for steelhead critical habitat on the Teepee Elk Allotment are expected to be moderate in the Elk pasture where cattle are having impacts to aquatic habitat. Construction of an exclosure would alleviate the current impacts along E.F. Peavine Creek. Proposed grazing activities would have insignificant impacts to aquatic and riparian habitats along Broady Creek.

Cumulative Effects

Cumulative effects for ESA consultation include the effects of future State, tribal, local or private actions that are reasonably certain to occur within the action area under consideration.

Activities on private lands likely have a higher potential to produce adverse cumulative effects due to the less restrictive management measures required for activities occurring on private lands compared to NFS lands. Private lands adjacent to the Cold Elk RA allotments are primarily used for livestock grazing. Specific information on numbers of livestock grazed on adjacent private lands is not known. General observations indicate that utilization levels are higher than those on NFS lands, road maintenance is minimal and invasive plants are widespread in some areas.

Determination of Effects

SR Steelhead

Cold Springs Allotment

Determination: The proposed livestock grazing on the Cold Springs Allotment ***may affect, not likely to adversely affect*** (***NLAA***) SR steelhead and their critical habitat:

- There is a low risk of redd disturbance during the spawning/emergence period. The proposed action relies on a combination of scheduled use of pastures, terrain and riparian features, and proposed fencing to separate livestock from spawning habitat on Cottonwood Creek during the spawning/emergence period. Construction of additional fencing on Deadhorse Creek, the Howard Cutoff Trail, and E.F. Cottonwood Creek will reduce the risk of cattle accessing Cottonwood Creek during the spawning/emergence period from adjacent pastures.
- Riparian/stream habitat is in good condition on upper Cottonwood Creek based on stream surveys, MIM and PFC assessments. Proposed rest of the Lower Cottonwood pasture for 5 years and nonuse of the Upper Cottonwood pasture every other year will increase the rate of recovery of Cottonwood Creek from the effects from the 1988 Teepee Butte Fire and 2017 debris flow event.
- The proposed action would result in annual negligible impacts to riparian/stream habitat features (including PACFISH RMOs and Matrix indicators). These impacts are not expected to carry over to the following year.
- The proposed action is consistent with PACFISH GM-1 and therefore allows for the attainment of PACFISH RMOs and riparian goals.
- The proposed action would result in annual negligible impacts to PBFs for SR steelhead DCH. These impacts are not expected to carry over to the following year.

Teepee Elk Allotment

Determination: The proposed livestock grazing on the Teepee Elk Allotment **may affect, not likely to adversely affect** (***NLAA***) SR steelhead and their critical habitat:

- There is a low risk of redd disturbance because the proposed action relies on terrain and riparian features (Rock Creek and Long Ridge pastures), pasture use timing, and construction of an exclosure along E.F. Peavine Creek (Elk pasture) to separate livestock from spawning habitat during the spawning/emergence period.
- Riparian/stream habitat is in good condition on portions of the allotment based on stream surveys, MIM and PFC assessments. Construction of the exclosure will result in improvement in stream/riparian conditions along E.F. Peavine Creek.
- The proposed action would result in annual negligible impacts to riparian/stream habitat features (including PACFISH RMOs and Matrix indicators). These impacts are not expected to carry over to the following year.
- The proposed action is consistent with PACFISH GM-1 and therefore allows for the attainment of PACFISH RMOs and riparian goals.
- The proposed action would result in annual negligible impacts to PBFs for SR steelhead DCH. These impacts are not expected to carry over to the following year.

Magnuson-Stevens Act

Essential Fish Habitat (EFH)

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of essential fish habitat (EFH) descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NMFS on activities that may adversely affect EFH. The Lower Grande Ronde Subbasin has been designated as EFH for Chinook and coho salmon.

Determination of Effect

Cold Springs Allotment

Based on the ESA effects analysis for the proposed grazing on habitat for Chinook salmon, proposed activities would have ***no effect*** to EFH for MSA-managed species on the Cold Springs Allotment. This determination is based on the following:

- Spawning, rearing and migration habitats for Chinook and coho salmon are not present on the allotment.

Teepee Elk Allotment

Based on the ESA effects analysis for the proposed grazing on habitat for Chinook salmon, proposed activities would have ***no effect*** to EFH for MSA-managed species on the Teepee Elk Allotment. This determination is based on the following:

- Spawning, rearing and migration habitats for Chinook and coho salmon are not present on the allotment.

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APPENDIX A – PFC ASSESSMENTS

PFC assessments are a qualitative method developed by the BLM for determining the condition of riparian areas and stream channels. Functionality of riparian areas and stream channels rated is using three condition levels (Prichard et al. 1998):

- PFC – vegetation, landforms, or large woody debris are present to adequately dissipate stream energy associated with normal high flows events without channel degradation. A PFC rating does not necessarily mean that a site is at its natural potential. However, in order for some types of stream channels (Rosgen stream types E, C and some B's) to be at PFC a majority of streambank vegetation would need to be mid- to late seral species.
- Functional at Risk (FAR) – riparian areas are still functioning, however, the condition of one or more attributes make the channel susceptible to degradation during normal high flow events.
- Nonfunctional (NF) – Riparian areas that do not provide adequate vegetation, landforms or large woody debris to dissipate stream energy during normal high flow events.

In addition to the three condition levels, condition trend is also rated as: static (no recognizable trend), upward trend (riparian and/or channel conditions improving), and downward trend (riparian and/or channel conditions declining).

The PFC assessment evaluates a suite of attributes and processes ("indicators") important in maintaining and restoring riparian and stream habitats. The indicators are divided into three categories: 1) Hydrology, 2) Vegetation and 3) Erosion/Deposition indicators.

1) Hydrology – indicators include: floodplains; beaver activity; sinuosity, width/depth ratio and gradient; riparian-wetland, and upland watershed.

2) Vegetation (Riparian) - indicators include: age-class distribution; species composition, wetland species presence; streambank vegetation rooting characteristics, plant vigor, streambank vegetative cover; and coarse wood and/or LWD potential. (Note: LWD as used by the PFC assessment processes is not synonymous with LWD as used by PACFISH. LWD under the PFC assessment process refers to all woody vegetation regardless of size class.)

3) Erosion/Deposition – indicators include: stream energy dissipation; point bar vegetation; vertical stability, and water and sediment balance.

PFC assessments can be an appropriate starting point for determining and prioritizing the type and location of quantitative inventory or monitoring necessities and has been proven to be an excellent communication tool for discussing and identifying grazing impacts to streams and riparian areas. PFC assessments are conducted with a journey-level interdisciplinary team. One purpose of these assessments is to help correlate the findings with the trend towards attainment of the PACFISH Riparian Management Objectives (RMOs), more specifically, to determine whether grazing practices are retarding attainment of near natural rates of recovery of RMOs as discussed in PACFISH Enclosure B (Rev. 7/31/95). Where a stream reach is determined to be PFC in relation to grazing activities and an upward trend is apparent it is assumed that PACFISH GM-1 is being met. PFC assessments are also used by the WMO to determine the location of designated monitoring areas for quantitative monitoring of stream/riparian attributes using the Multiple Indicator Monitoring process.

The WMO experimented with a modified PFC assessment (PFC Plus) for the Cold Elk RA.

The objective of PFC Plus is to make the PFC assessment more quantifiable be creating a numeric scoring system for each question and to provide additional discussion of the factors affecting the rating of each question. Each question was rated as to the current condition of the stream compared to its natural potential.

1) Scoring each question:
   - 1 point- Extreme Departure from natural conditions (ED)
   - 2 points - Nonfunctional (NF)
   - 3 points - Functioning at Risk (FAR)
   - 4 points - Properly Functioning (PFC)
   - 5 points - Potential Natural Condition-(PNC)

2) Scoring PFC assessment (85 points possible without N/As; adjust scoring as needed if N/As are present):
   - PNC: 77 -85 points (90 – 100%)
   - PFC: 60 – 76 points (70 – 89%)
   - FAR: 43 – 59 points (50 – 69%)
   - NF: 26 – 42 points (30 – 49%)
   - ED: 17 – 25 points (<30%)

Below are examples of how the numeric rating was used with the standard PFC questionnaire:

PFC Question H-1: Floodplain above bankfull is inundated in relatively frequent events (1.5 year average)
   - 1 -Extreme Departure – Rosgen G channel present.
   - 2 - Nonfunctional – Rosgen F channel present or floodplain not inundated.
   - 3 - Functioning at Risk – Floodplain inundated infrequently, roughness elements not present to dissipate flood energy.
   - 4 - Properly Functioning – Floodplain inundated frequently, some roughness elements present to dissipate flood energy.
   - 5 - Potential Natural Condition – Floodplain regularly inundated, roughness elements present on floodplain to dissipate flood energy.

PFC Question H-2: Where Beaver dams are present, they are active and stable.
   - 1 - Extreme Departure – Beaver extirpated (historic beaver activity present), current conditions will no longer support beaver.
   - 2 - Nonfunctional - Beaver extirpated (historic beaver activity present), current conditions will support beaver.
   - 3 - Functioning at Risk – Beaver dams present, dams are inactive, current habitat is marginal for beaver occupancy.
   - 4 - Properly Functioning – Beaver dams present, dams are active, current habitat is marginal for beaver occupancy.
   - 5 - Potential Natural Condition – Beaver dams present, dams are active, habitat is suitable for long-term occupancy.

PFC Question H-3: Sinuosity, width/depth ratio, and gradient are in balance with landscape setting.
   - 1 - Extreme Departure - Rosgen stream type mismatched with valley type
   - 2 – Nonfunctional – Rosgen stream type is a G or F.
   - 3 – Functional at Risk – Stream's sinuosity, width/depth ratio and/or gradient is not appropriate for stream type. Indications of recovery are not present. Headcut present.
   - 4 – Properly Functioning – Stream's sinuosity, width/depth ratio and/or gradient is slightly departed from its stream type. Indications of recovery are present.

5 – Potential Natural Condition – Stream has appropriate sinuosity, width/depth ratio, and gradient for its Rosgen stream type and matched with valley type. No indications of degradation present.

We found that the numeric rating system encouraged a deeper discussion of the PFC questions while conducting the PFC assessment that led to a better understanding of the capability and current status of the stream reaches assessed.

APPENDIX B – MULTIPLE INDICATOR MONITORING

Multiple Indicator Monitoring of Stream Channels and Streamside Vegetation (MIM) was developed by BLM to provide quantitative information necessary for managers, landowners, and others to adaptively manage riparian resources. The MIM protocol is designed to be objective, efficient, and effective for monitoring streambanks, stream channels, and streamside riparian vegetation. Indicators and procedures in this protocol were selected and developed primarily to monitor impacts of livestock and other large herbivores on wadable streams (usually less than 10 m wide). The MIM protocol integrates annual grazing use and long-term trend indicators allowing for evaluation of livestock grazing management.

Designated Monitoring Areas (DMAs)

Because the location of monitoring sites is a critical component of obtaining useful monitoring data, the MIM protocol addresses stratifying riparian vegetation complexes and stream segments and locating designated monitoring areas (DMAs). The DMA is the location on the stream where all monitoring procedures described in this protocol occur. A DMA is a permanently marked segment of a stream at least 110 m long that has been selected for monitoring. DMAs are established by an interdisciplinary team of highly experienced personnel with knowledge of the management area. There are three types of DMAs: 1) Representative, 2) Critical, and 3) Reference DMAs.

Representative DMA: A representative DMA is a monitoring site in a riparian complex that is representative of a larger area. This is the most common type of DMA used by land managers. Representative DMAs should be located within a single riparian complex.

When more than one riparian complex occurs in a management unit, the DMA should be placed in the riparian complex that is the most sensitive to management influences. The premise is that if the DMA is placed in the most sensitive complex and that complex is being monitored and managed to achieve desired conditions, then the other less sensitive complexes will also be managed appropriately. The criteria for selecting representative DMAs are that:

- The riparian complex for the DMA is selected by an experienced interdisciplinary team.
- The DMA is located in a complex that represents and is accessible to the management activities of interest.
- The DMA is randomly located in the riparian complex that is the most sensitive to the management activities of interest. When the most sensitive riparian complex is spatially discontinuous within a management unit (i.e., multiple subsections or reaches of the same complex are interrupted by other complexes), the subreach selected for the DMA location is randomly chosen.
- Within the most sensitive complex, the DMA is located on a site that is sensitive to disturbance and is not located on reaches impervious to disturbance (for monitoring streambank stability and streambank alteration). Such reaches may be appropriate for monitoring woody species age class and woody species use.
- The DMA will respond to the management influence of interest and resource objectives can be achieved at the DMA; i.e., the site has the potential to respond to and demonstrate measureable trends in condition resulting from changes in grazing management or other management activities influencing stream channels and riparian vegetation (also applicable to a reference DMA).
- The gradient of the stream reach at the DMA is generally less than 4 percent. The gradient may exceed 4 percent if the reach has a distinctly developed floodplain and the riparian vegetation heavily influences channel stability (also applicable to a reference DMA).

- The DMA is located outside of a livestock concentration area. DMAs should not be located at water gaps or locations intended for livestock concentration or in areas where riparian vegetation and streambank impacts are the result of site-specific conditions (such as along fences where livestock grazing use is not representative of the riparian area). These local areas of concentration may be monitored to address highly localized issues if necessary (in which case, they would be described as critical DMAs as defined in the next section).
- The DMA is free from the influence of compounding activities. DMAs should not be located in areas compounded by activities that make it difficult to establish cause and-effect relationships. For example, an area used heavily by both recreationists and livestock would not make a good DMA to determine the effects of livestock grazing on stream conditions.

Critical DMA: A reach that is not representative of a larger area but is important enough that specific information is needed at that particular site is a critical DMA. Critical DMAs are monitored for highly localized purposes and to address site-specific questions. For example, small critical spawning reaches may be monitored when there is concentrated livestock use. Extrapolating data from a critical DMA to a larger area may not be appropriate within the complex containing the critical area. A critical DMA does not have to meet the criteria for a representative DMA.

Reference DMA: A reach chosen to obtain reference data useful for identifying potential condition and for establishing initial desired condition objectives for a similar riparian complex is a reference DMA. A common example is a grazing exclosure where livestock access to the stream is restricted. Ungrazed references used for reference DMAs need to be carefully analyzed to ensure their usefulness as a comparison. Reference DMAs meet many of the same criteria as representative DMAs. When the monitoring objective is to assess management effects over time, both a representative DMA and reference DMA might be used.

Short-term Indicators

Short-term indicators (aka "annual indicators" or "implementation indicators") provide information necessary to help determine whether the current season's livestock grazing is meeting grazing use criteria. They can be used as early warning indicators that current grazing impacts may prevent the achievement of management objectives and can also be used to help explain changes in riparian vegetation and channel conditions over time. Monitoring of short-term indicators is termed "implementation" monitoring. Implementation indicators include: 1) bank alteration, 2) stubble height, and 3) shrub utilization. [Note: The WMO is transitioning from key areas to DMAs. As DMAs are established implementation monitoring will shift from key areas to DMAs. Implementation monitoring data collected at key areas is presented in the "Implementation Monitoring Data" section under Allotment History.]

Implementation monitoring on the four allotments is accomplished in accordance with IIT and Region 6 monitoring direction for grazing allotments as directed in the salmon, steelhead and bull trout PACFISH and INFISH Biological Opinions issued by the National Marine Fisheries Service (NMFS) and the U.S. Fish And Wildlife Service (USFWS), respectively, and from guidance provided by the Interagency Implementation Team (IIT) charter, the U.S. Forest Service (FS) and the U.S. Bureau of Land Management (BLM). IIT implementation monitoring procedures can be found in "2002 Land Use Integrated Implementation Monitoring Module for PACFISH/INFISH and the 1998 Biological Opinions" and annual letters of direction for meeting PIBO range allotment monitoring commitments from the Regional Forester, R-6.

Long-term Indicators

Long-term indicators (aka "effectiveness indicators") provide data to assess the current condition and trend of streambanks, channels, and streamside vegetation. They help determine if local livestock grazing management strategies and other land management actions are making progress toward achieving the long-term goals and objectives for streamside riparian vegetation and aquatic resources. Monitoring of long-term indicators is termed "effectiveness" monitoring.

The following long-term indicators were used in determining the condition of riparian habitat with respect to livestock grazing activities on the CERA allotments:

Greenline Composition (adapted from Winward 2000 and USDI, BLM 1996a)

The concept of greenline composition was developed to provide a way to observe and measure the vegetation that is most critical to maintaining stream channel stability (Winward 2000). Riparian vegetation is critically important for the stability of streambanks, streambank morphology (width, depth, and shape), water quality, and aquatic habitat quality (Hansen et al. 1988). Livestock grazing, as well as other anthropogenic disturbances, may impact vegetation through reduced vigor, soil compaction, changing species, and physical disturbance of the streambanks (Platts 1991; Wyman et al. 2006). Sampling along the greenline is designed to account for the continuous line of vegetation occurring along most streambanks (Winward 2000). Since streams are dynamic, measuring vegetation along the greenline, which can move in response to annual streamflow levels, is particularly effective for understanding the overall condition and health of the stream reach. Determining the species of plants along the streambanks provides an indication of the condition, based on the health and amount of deep, strong-rooted vegetation, and the trend toward or away from the objectives established for the stream reach.

The greenline follows the streambank as erosion and deposition occur along a stream. Therefore, the composition of vegetation in this zone directly affects the condition of streambanks and overall stream condition. The major plant species along the greenline are helpful for analyzing the effects of livestock grazing along a stream. The following metrics are used to summarize greenline composition data:

1) Streambank Stability: Streambanks can become unstable or unable to resist the erosive effects of high streamflows as a result of improper livestock grazing. Bare streambanks, either in erosional or depositional positions of the stream, are considered unstable due to their vulnerability to erosion. The effect of excessive grazing is to alter the streamside vegetation composition resulting in a dominance of plants that are more vulnerable to erosion (Platts 1991; Bauer and Burton 1993). Mass wasting may also result from breakoffs, hoof slide, and hoof shear related to the physical disturbances of trampling (Bauer and Burton 1993; Powell et al. 2000). Unstable streambanks can lead to accelerated bank erosion and subsequent channel widening, increased sediment supply, decreased sediment transport capability, and damaged fisheries habitat. [Desired range ≥90% WMO allotments.]

2) Streambank Cover: Streambank stability is strongly influenced by streamside vegetation (Bauer and Burton 1993). For the MIMs protocol streambank cover is defined as rooted vegetation, rocks, and/or LWD. Streambanks are considered to be covered if at least 50% foliar cover of perennial vegetation; at least 50% cover of rocks 15 cm or larger; at least 50% cover of anchored LWD with a diameter of 10 cm or greater; or a combination of the vegetation, rock, and/or LWD covering at least 50 of the bank area of a plot. MIMs does not provide a rating for streambank cover. [Desired range is ≥90% for WMO allotments.]

3) Greenline Ecological Status Rating: This is a measure of the average ecological status rating (i.e. seral stage) of plants as defined by Winward (2000, table below). Plants are weighted according to their percent composition. This metric is calculated using plant successional status ratings and Winward's riparian capability groups. It is further adjusted where a woody overstory component should be present but currently is not present. [Desired ratings range from "Late" to "PNC" for WMO allotments where DMAs are located on perennial stream reaches.]

Greenline Ecological Status Ratings (Winward 2000)

Value	Rating
0-15	Very Early
16-40	Early
41-60	Mid
61-85	Late
86+	Potential Natural Community (PNC)

Ecological status is sometimes referred to as "successional status, successional stage, or seral stage" and refers to the relative position of individual plants or a plant community in relationship to climax. The ecological status rating classes for individual plants are:

- Early Seral (E) – All annual and short-lived (living less than 5 years) perennial plants tend to be replaced by plants that live longer. All noxious weeds and shallow-rooted perennial species that tend to be tolerant of grazing and other uses are classified as early seral.
- Mid-Seral (M) – Perennial plants, mostly forbs that are not shade tolerant and tend to have fibrous root systems. These plants are usually replaced in a riparian community by long-lived plants.
- Late Seral (L) – Plants that usually exist in the most stable riparian plant communities. They tend to stabilize streambanks and develop extensive root systems.

4) Site Wetland Rating: This metric represents the average wetland rating of plants as computed using the site wetland rating (Coles-Ritchie 2005, table below). Wetland indicator status (USDI Fish and Wildlife Service 1993) values for individual species may vary by region. The Data Analysis Module accounts for that variation. [Desired ratings are ≥67 (FACW-) for WMO allotments.]

Site Wetland Rating (Coles-Ritchie 2005)

Value	Rating*	Value	Rating*
0	UPL	58	FAC+
8	UPL+	67	FACW-
17	FACU-	75	FACW
25	FACU	83	FACW+
33	FACU+	92	OBL-
42	FAC-	100	OBL
50	FAC		

*Notes:

- OBL (obligate wetland plants) - Almost always occur in wetlands.
- FACW (facultative wetland plants) - Usually occur in wetlands, but may occur in non-wetlands
- FAC (facultative wetland plants) - Occur in wetlands and non-wetlands
- FACU (facultative upland plants) - Usually occur in non-wetlands, but may occur in degraded wetlands
- UPL (upland plants) - Almost never occur in wetlands except in degraded conditions

5) Modified Winward Greenline Stability Rating: This metric represents the average stability rating of plants as defined in the plant list in the Data Analysis Module and are based on Winward (2000) greenline stability ratings (table below). [Desired rating is "High" for WMO allotments.]

Modified Greenline Stability Rating (Winward 2000)

Value	Rating
<4	Low
5-6	Moderate
>6	High

6) Shade Index: This metric represents the average height of all woody plants divided by the greenline-to-greenline width (GGW). Shade increases with increasing plant height and decreasing GGW (Bartholow 2002). [Desired rating is "High" for WMO allotments.]

Shade Index Ratings

Value	Rating
<0.5	Very Low
0.5 - <1.0	Low
1.5 - <2.0	Moderate
2.0 - <4.0	High
≥4.0	Very High

7) Hydric Plants Percent: This metric is a measure of the proportion of the greenline composition consisting of hydric plants. It is calculated by summing of the total percent composition of plants rated as "hydric" divided by the total of all plants. "Hydric" is defined as those plants classified in the wetland indicator status (USDI Fish and Wildlife Service 1993) as facultative to obligate. There is a general consensus that most streams require at least 70% of their potential late seral types to be minimally functional (Elmore 2005). The WMO objective is to have at least 80% late seral vegetation of the expected amount based on capability group. [Desired rating is >64-78% for WMO allotments.]

Greenline Riparian Capability Groups (Adapted from Winward 2000, Appendix A)

Greenline Riparian Capability Group[1]	% Expected Late Seral Vegetation[1]	WMO Objective[2]
I	98+	≥78
II	90+	≥72
III	90+	≥72
IV	85+	≥68
V	85+	≥68
VI	80+	≥64
VII	80+	≥64
VIII	85+	≥68

Notes: 1) From Winward 2000; 2) 80% of capability group

[Elmore, W. 2005. Estimating percent vegetation cover on streambanks for the Proper Functioning Condition Assessment for Lotic Areas Item 11. Full Stream Consulting.]

*[Note: the above information excerpted from: Burton, T.A., S.J. Smith, and E.R. Cowley. 2011. Riparian area management: Multiple indicator monitoring (MIM) of stream channels and streamside vegetation. Technical Reference 1737-23. BLM/OC/ST-10/003+1737. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO. 155 pp. See this publication for references cited above. Available online at: http://www.rmsmim.com/Portals/0/MIMdoc.pdf]

Intermittent vs Perennial Streams

Water availability for plants can be lower along intermittent streams compared to perennial streams and thus the potential for a site to support late seral riparian plants can be lower. We developed the following objectives for DMAs on intermittent streams as a starting point for interpreting MIM results.

Indicator	Perennial DMA	Intermittent DMA
Streambank Stability (%)	≥90	≥90
Streambank Cover (%)	≥90	≥90
Fine Sediment (%)	<20	<20
Greenline Ecological Status Rating	>61 (Late)	>52 (Upper Mid)
Site Wetland Rating	≥67 (FACW-)	≥58 (FAC+)
Winward Greenline Stability Rating	>6 (High)	>5.5 (Mid)
Shade Index	≥3 (High)	≥2 (High)
Hydric Plants (%)	≥64-78	N/A

APPENDIX C - LOCATIONS OF MONITORING POINTS

Cold Springs Allotment

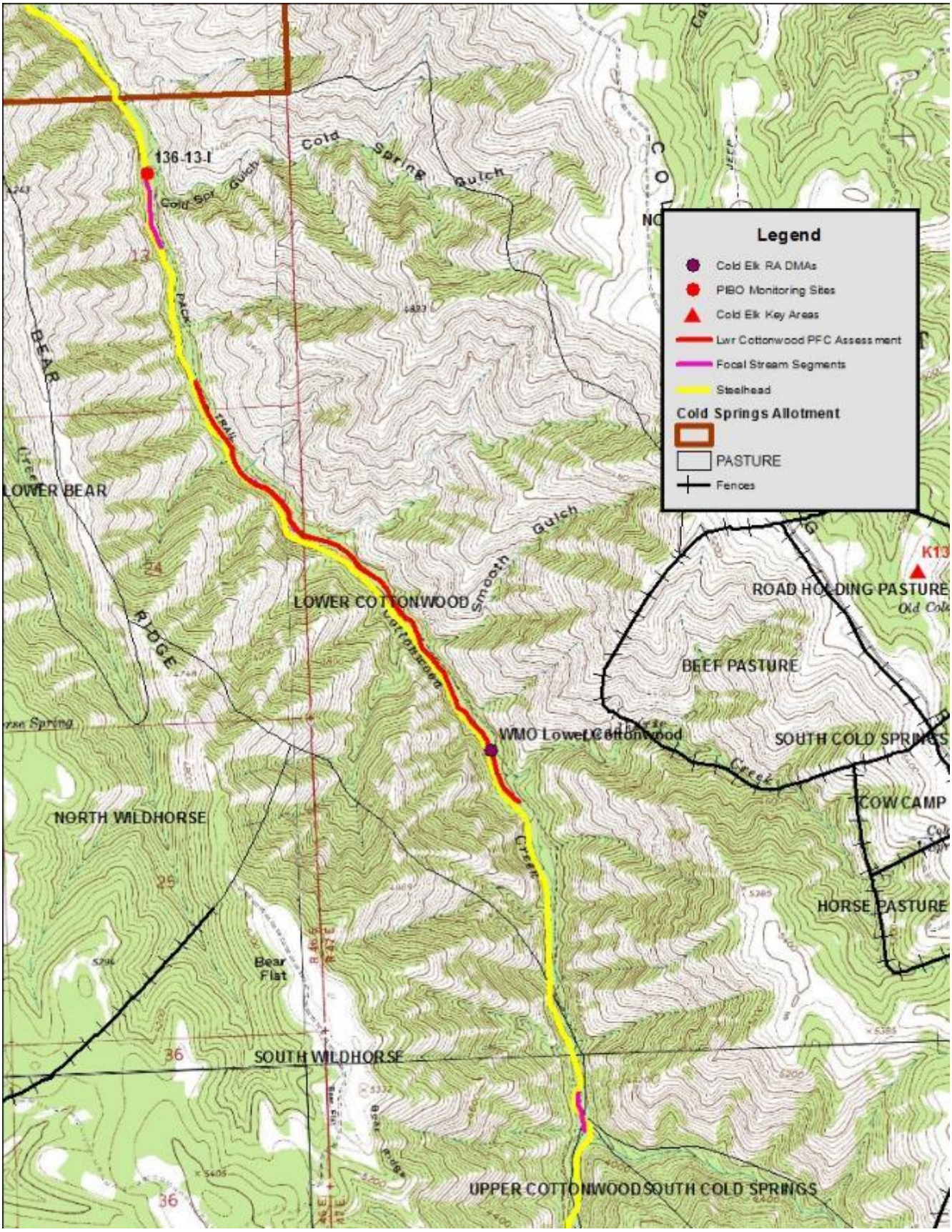

Figure C-1. Monitoring locations along lower Cottonwood Creek, Cold Springs Allotment.

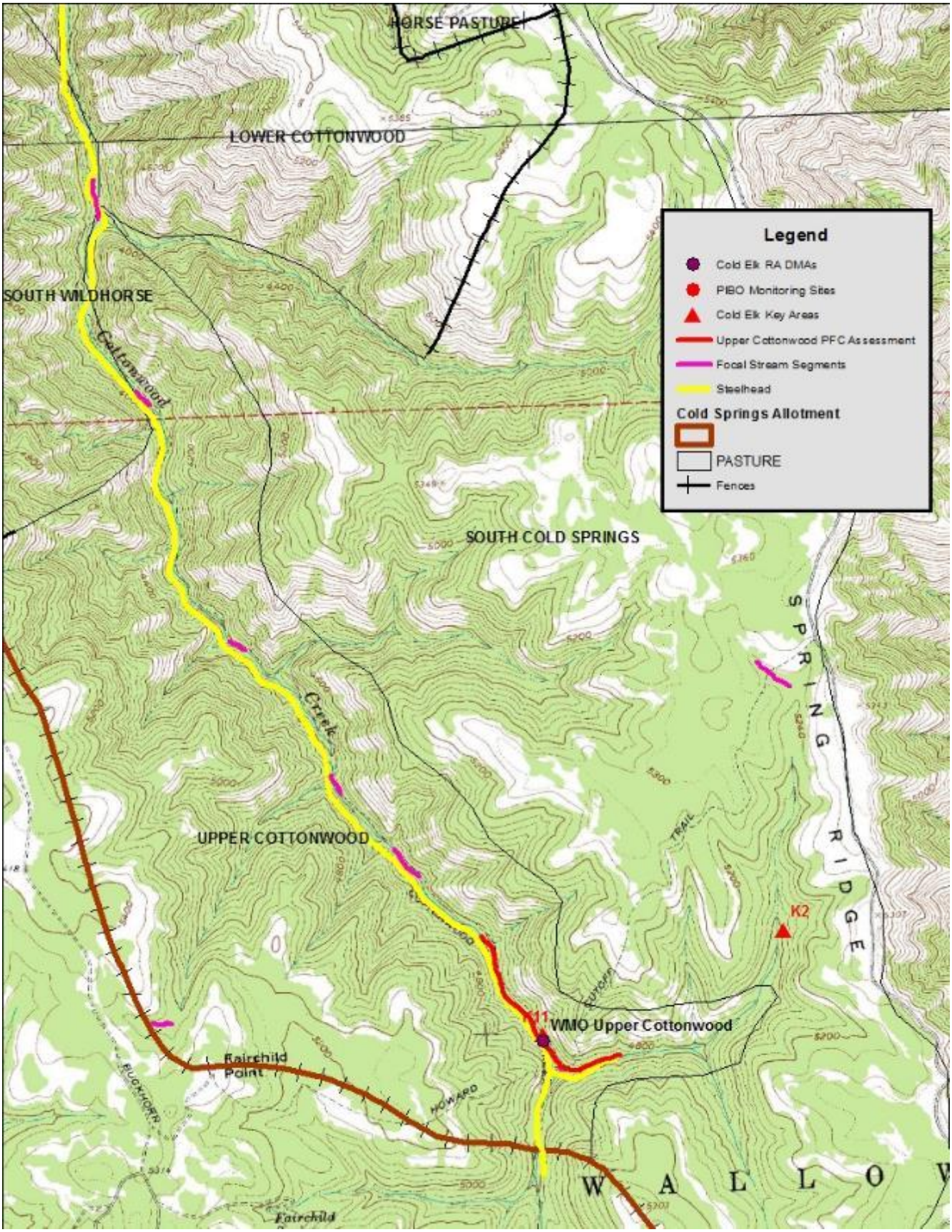

Figure C-2. Monitoring locations along upper Cottonwood Creek, Cold Springs Allotment.

Teepee Elk Allotment

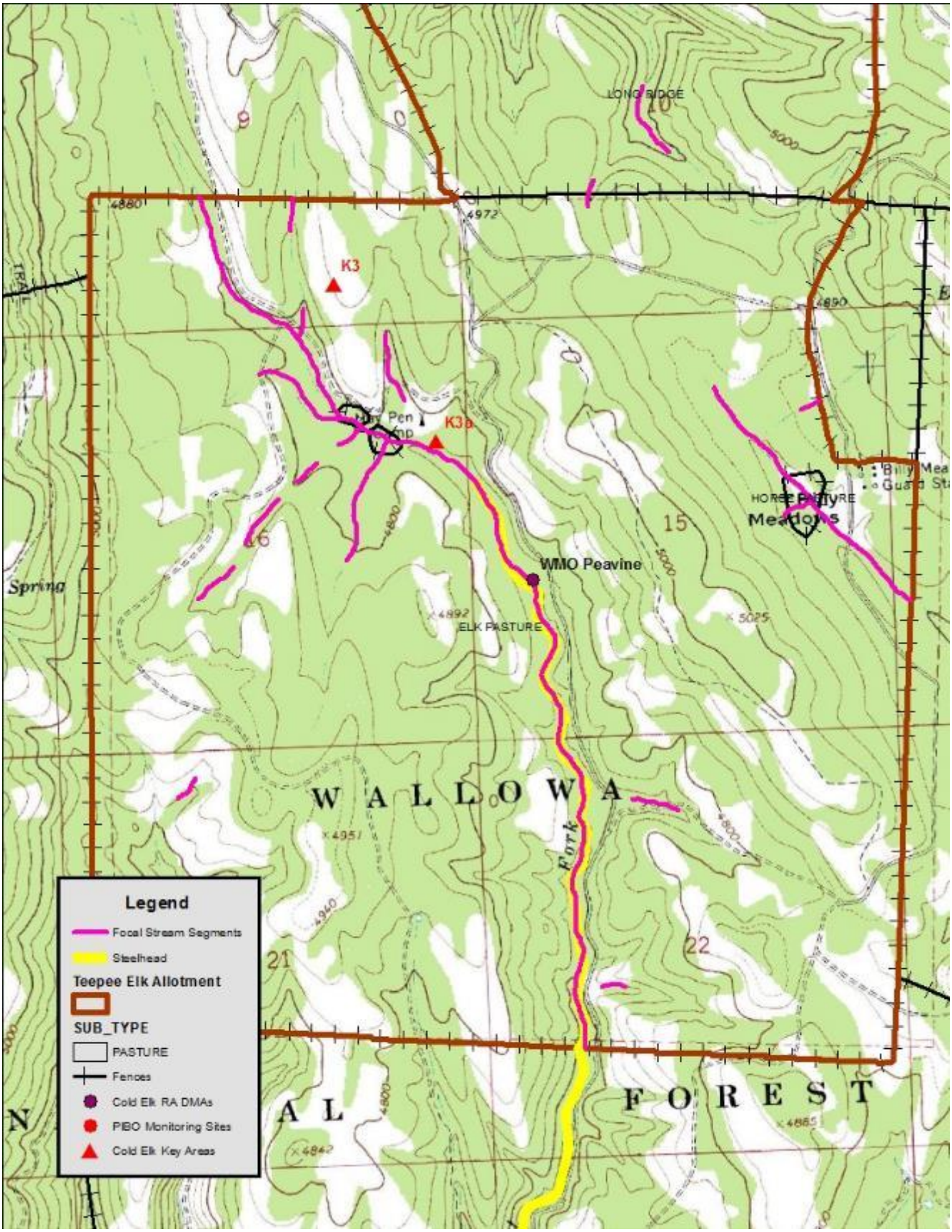

Figure C-3. Monitoring locations along E.F. Peavine Creek, Teepee Elk Allotment.

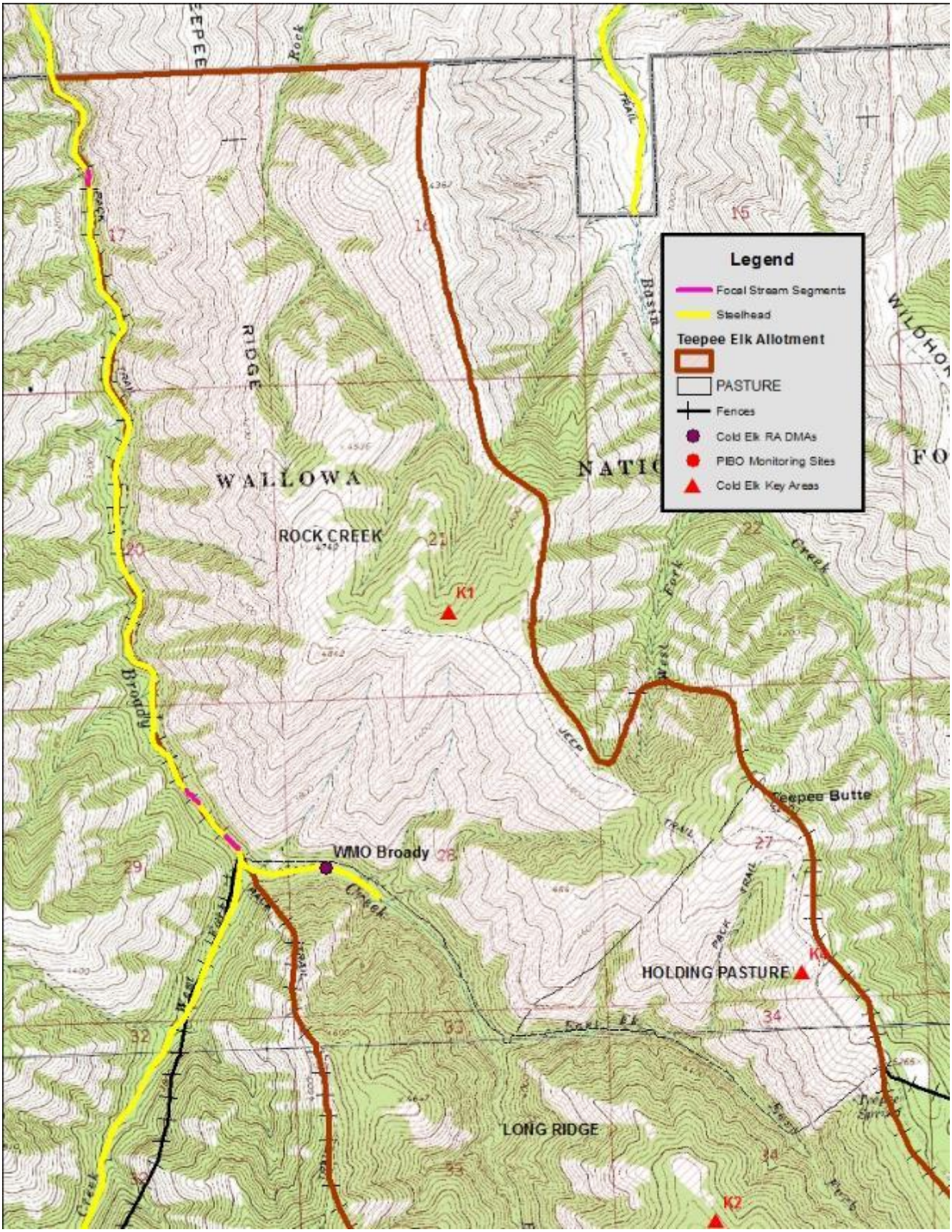

Figure C-4. Monitoring locations along Broady Creek, Teepee Elk Allotment.

APPENDIX D – FOCAL STREAM SEGMENTS

A GIS analysis of streams in the analysis area for the Cold Elk Range Analysis was conducted to identify stream segments ("focal stream segments") that are likely to be areas where livestock congregate and are sensitive to livestock disturbance. Livestock disturbance includes: alteration of stream habitat from bank alteration, herbivory, and disturbance of salmonid redds resulting from grazing livestock. Alteration of stream habitat includes accelerated bank erosion, increases in width to depth ratios, altered channel patterns, induced channel instability, and increased sediment supply (Rosgen 1996). Alteration of riparian vegetation accompanies the alteration of stream habitat.

Stream channels with relatively low gradients (≤0.02), fine textured streambank material, and moderate to fine streambed substrates are the most sensitive types of stream channels to livestock disturbance. Additionally, streams with relatively wide valleys are attractive to livestock. These same features of stream channels, low gradients and relatively wide valleys, have been recognized as biological hotspots for stream dwelling salmonids.

Methods

To identify stream segments where livestock are likely to be attracted to ("focal stream segments"), we utilized the NetMap stream layers that were developed for the Blue Mountains Forest Plan Revision effort. We utilized gradient and valley width index (VWI) values from NetMap stream segments; and a minimum cumulative length of adjacent stream segments to identify focal stream segments. The NetMap VWI parameter is the ratio of the valley width to the bankfull width and gives an estimate of the valley floor that is not occupied by the stream channel for each stream segment. All parameter values for NetMap stream segments are derived from spatial modelling. More information on NetMap is available at: http://www.netmaptools.org/Pages/NetMap_help_FAQ/what_is_terrainworks__netmap__.htm. We ran three iterations of the model to determine parameter values that best fit field observations of cattle use in riparian areas across allotments on the Wallowa Valley RD, Eagle Cap RD and Hells Canyon NRA (Table D-1).

Table D-1. Model parameters used to identify focal stream segments.

Model	Gradient	Valley Width Index	Cumulative Length
1	≤0.0300	≥5.00	150 m
2	≤0.0300	≥4.00	100 m
3	≤0.0325	≥3.75	75 m

Results and Discussion

To identify focal stream segments where livestock are likely to be attracted to we initially identified stream valley segments with a gradient less than or equal to 0.03 with a valley floor width index of at least 5 and a cumulative segment length greater than 150 meters. We hypothesize that valley bottoms of this size have sufficient width to develop a true floodplain to be attractive to cattle. However, comparing the results of this first model with field observations across the three ranger districts indicated that model excluded areas where cattle are known to congregate. Two more versions of the model were developed before a reasonably conservative model was arrived at. Model 3, the final model, appears to have a high degree of correspondence with field observations across the three districts of the Wallowa Mountains Zone. Since the gradient for all three models was greater than

0.02, we are confident that stream segments that are sensitive to livestock disturbance were captured by the analysis.

There appears to be a positive relationship between the gradient and VWI parameters when comparing the modelling results to field observations. As the gradient of a stream segment decreases, VWI of focal stream segments may also decrease. We originally believed that valley floor width index of at least 5 was needed to have enough floodplain width to be attractive to cattle. However, to capture known high use areas by cattle we reduced the VFWI in subsequent models.

Four caveats for the focal stream segment analysis should be kept in mind:

1) The focal stream segment analysis relies on data that has been derived from spatial modelling. Both the NetMap gradient and VWI parameters are based on spatially modelling and actual conditions on the ground will likely be somewhat different.
2) The focal stream segment analysis does not account for accessibility of stream segments. In some areas, especially in canyon areas, areas identified as focal stream segments will not be physically accessible to cattle due to terrain.
3) The focal stream segment analysis does not account for riparian vegetation conditions that may or may not be attractive to cattle.
4) There may be underlying relationships between the parameters used in the model that may mean they are not independent.
5) NetMap over estimates the gradient of some low gradient reaches (< 0.02). This is due to the use of the 10-meter DEM that was available for the Wallowa-Whitman NF at the time the NetMap stream network was created. However, these low gradient stream reaches that are sensitive to livestock use are captured as part of the FSS analysis.

Overall, we believe the focal stream segment analysis is useful in identifying stream segments and their associated riparian areas that are potentially high use areas for cattle in the Wallowa Mountains and adjacent areas. In addition to identifying potential high use areas adjacent to stream, the analysis can be used for: 1) determining locations for riparian/stream monitoring (e.g. placement of MIMs sites), 2) determining if current riparian monitoring locations are capturing potential high use areas, 3) identifying high priority areas for stream/riparian field visits, and 4) identifying potential areas where cattle and ESA-listed fish species have a high degree of overlap. Additionally, the model identifies focal stream segments in upland areas where fish are not present though impacts from high cattle use may occur.

Cold Elk Range Analysis

Cold Springs Allotment

Focal stream segments were rare in Cold Springs Allotment with focal stream segments in fish bearing stream segments occurring along Cottonwood Creek (Figure D-1). There were nine focal stream segments identified along Cottonwood Creek. The uppermost FSS on Cottonwood Creek encompasses the upper Cottonwood MIM site. Focal stream segments were not identified along Cook Creek, the other fish bearing stream on the Cold Springs Allotment.

Table D-2. Miles of focal stream segments in the Cold Springs Allotment.

Pasture	Stream	Miles of Steelhead Habitat	Miles of Focal Stream Segments	% Focal Stream Segment
Lower Cottonwood	Cottonwood Creek	3.9	0.6	15.4
Upper Cottonwood	Cottonwood Creek	3.7	0.6	16.2

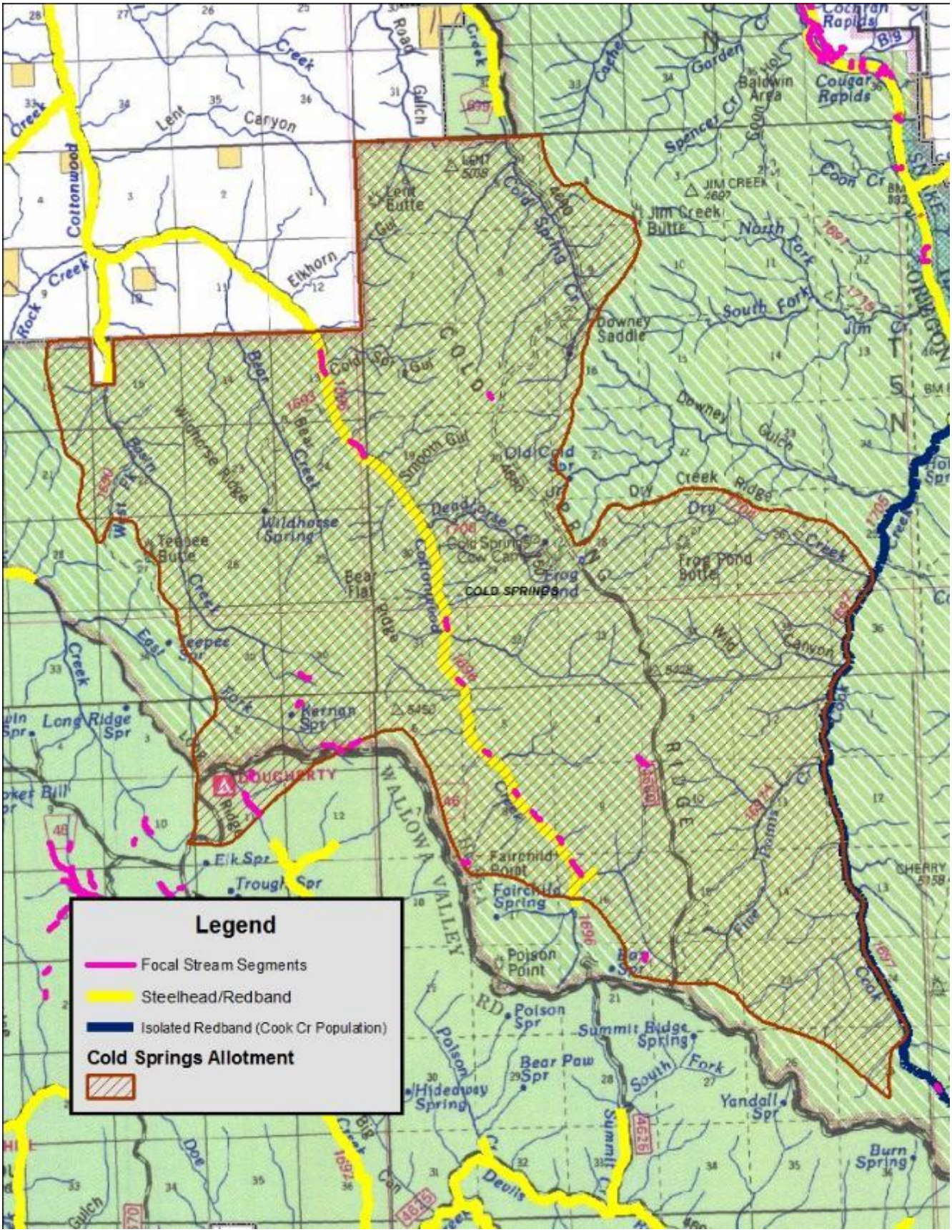

Figure D-1. Locations of focal stream segments (Model 3) on the Cold Springs Allotment.

Teepee Elk Allotment

For Teepee Elk Allotment, E.F. Peavine Creek was identified as a focal stream segment which correlates with observations made during field visits (Figure D-2). A MIM site is located within the FSS identified on upper E.F. Peavine Creek. A riparian exclosure with strategic watergaps along the portion of E.F. Peavine Creek with spawning/rearing habitat for steelhead is part of the proposed action for the Cold Elk RA. Broady Creek had few areas identified as focal stream segments (Figure D-2). The majority of area in upper Billy Creek identified as a FSS on the allotment is already fenced as part of the Billy Aspen exclosure.

Table D-3. Miles of focal stream segments in the Cold Springs Allotment.

Pasture	Stream	Miles of Steelhead Habitat	Miles of Focal Stream Segments	% Focal Stream Segment
Elk	E.F. Peavine Creek	2.4	2.4	100.0
Rock Creek	Broady Creek	3.9	0.2	5.1
Long Ridge	Broady Creek	0.5	0.0	0.0

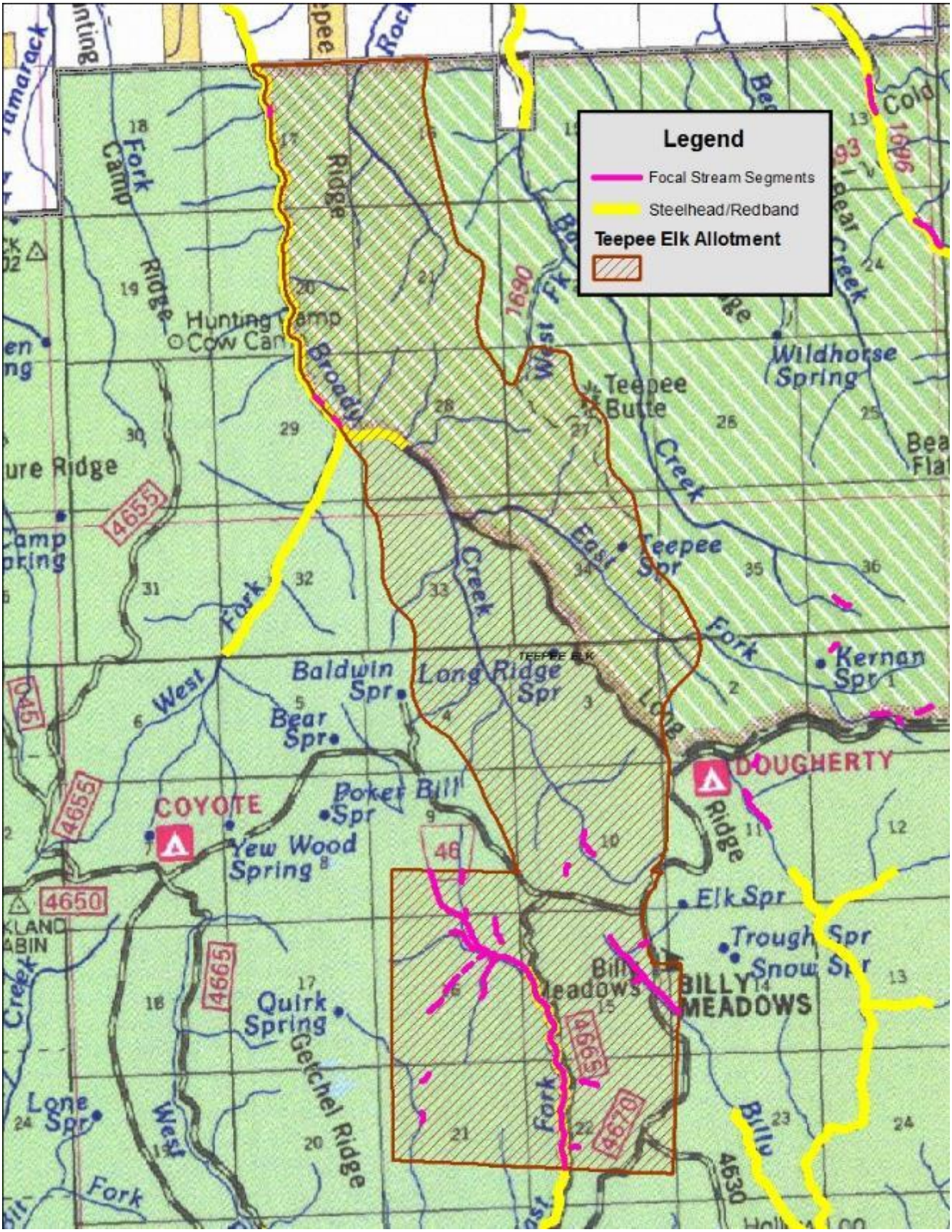

Figure D-2. Locations of focal stream segments (Model 3) on the Teepee Elk Allotment.

APPENDIX E – ACCESSIBILITY

A GIS analysis of streams with ESA-listed fish habitat in the analysis area for the Cold Elk Range Analysis was conducted to identify their accessibility by livestock. The GIS accessibility analysis complements observations made during field visits to identify accessible stream reaches.

Accessible stream reaches are stream reaches that are physically accessible by livestock. Inaccessible stream reaches are reaches that are not accessible due to a physical barrier (e.g. fences, steep terrain). Terrain barriers are areas with slopes >60%. Potential access routes include trails, roads or where terrain between livestock use areas is <60% slope. Livestock use areas were modeled using two models: 1) The Blue Mountain Forest Plan (BMFP) capable/suitable model ("suitable rangeland", Countryman 2010), and 2) Expected-Use model (Guenther et al. 2000). The expected-use model includes two factors: 1) slope and 2) distance to water.

We converted expected use classes to accessibility classes to identify potential travel corridors for livestock (Table E-1). We classified areas with expected use class ≥ Incidental (EU6) as potential travel corridors for livestock (Table E-1). Accessibility was rated as High (AC1, AC2), Moderate (AC3, AC4), Low (AC5, AC6), and Inaccessible.

Table E-1. Expected use and accessibility classes used to identify potential livestock travel corridors.

Expected Use Class	Accessibility Class	Percent Slope	Distance to Water
High (EU1)	High (AC1)	0 to 6	0 to 250 yards
Moderate (EU2)	High (AC2)	0 to 6	250 yards to 1 mile
Moderate (EU3)	Moderate (AC3)	6 to 33	0 to 250 yards
Low (EU4)	Moderate (AC4)	6 to 33	250 yards to 1 mile
Incidental (EU5)	Low (AC5)	0 to 6	1 to 2 miles
Incidental (EU6)	Low (AC6)	33 to 60	250 yards to 1 mile
Incidental	Inaccessible	33 to 60	1 to 2 miles
None	Inaccessible	> 60	N/A

We used the BMFP capable/suitable model to identify areas where grazing by livestock would likely occur. This allowed us to determine the likelihood that livestock would utilize travel corridors identified by our accessibility model.

Once potential travel corridors were identified we classified stream reaches as High, Moderate, Low, and Inaccessible reaches. Highly accessible reaches are reaches where livestock are expected to be present majority of the time they are present in a pasture. There are no barriers (natural, manmade, behavioral) that would impede access to the stream. Focal stream segments represent the majority of the habitat present the reach. Pastures with highly accessible stream reaches should not be grazed during the spawning/emergence period due to the high risk of disturbance of redds.

Moderately accessible reaches are reaches where some barriers are present but access routes are present. These access routes are roads, trails, or terrain that livestock can use to access a stream. Pastures with moderately accessible stream reaches have a moderate risk of disturbance of redds. Mitigation measures such as drift fences across access routes can reduce the risk of disturbance of redds. Moderately accessible reaches should not be grazed during the spawning/emergence period unless there is a high degree of confidence in mitigation measures or mitigating factors.

Reaches with an accessibility rating of low are reaches where few access routes are present, but mitigation factors can result in a high degree of confidence that cattle are unlikely to access the reach. Factors such as the amount of focal stream segments in a reach, seasonality of grazing, herding practices, and fencing make it unlikely that redds will be disturbed if the pasture is grazed during the spawning/emergence period. Herding practices such as placing cattle in upland areas when entering a pasture will also reduce the potential for disturbance of redds.

Inaccessible reaches are reaches where physical barriers are present that prevent livestock from accessing a stream reach. There is no risk of redd disturbance from livestock. Pastures with inaccessible reaches can be grazed at any time.

References

Countryman, B. 2010. Range suitability/capability process. Blue Mountain Forest Plan Revision white paper, Wallowa-Whitman NF, Baker Oregon, 12 pp.

Guenther, K.S., G.E. Guenther, and P.E. Redick. 2000. Expected-use maps. Rangelands 22:18-20.

Cold Elk Range Analysis

Teepee Elk Allotment

Elk Pasture – E.F. Peavine Creek

Both the GIS accessibility analysis and field visits identified that all of E.F. Peavine Creek is accessible to livestock from adjacent upland areas. The upland area adjacent to E.F. Peavine Creek has rolling topography without steep terrain, E.F. Peavine is directly adjacent to areas with predicted high and moderate use. Additionally, roadbeds adjacent to and cross E.F. Peavine Creek. Upland water sources are present in the southwest corner of the pasture. However, due to the rolling topography of the pasture they are unlikely to keep cattle from utilizing E.F. Peavine Creek as a water source. Schedule use of the pasture after the spawning/emergence period (>July 1). Construction of an exclosure around spawning habitat would allow use of the pasture prior to July 1.

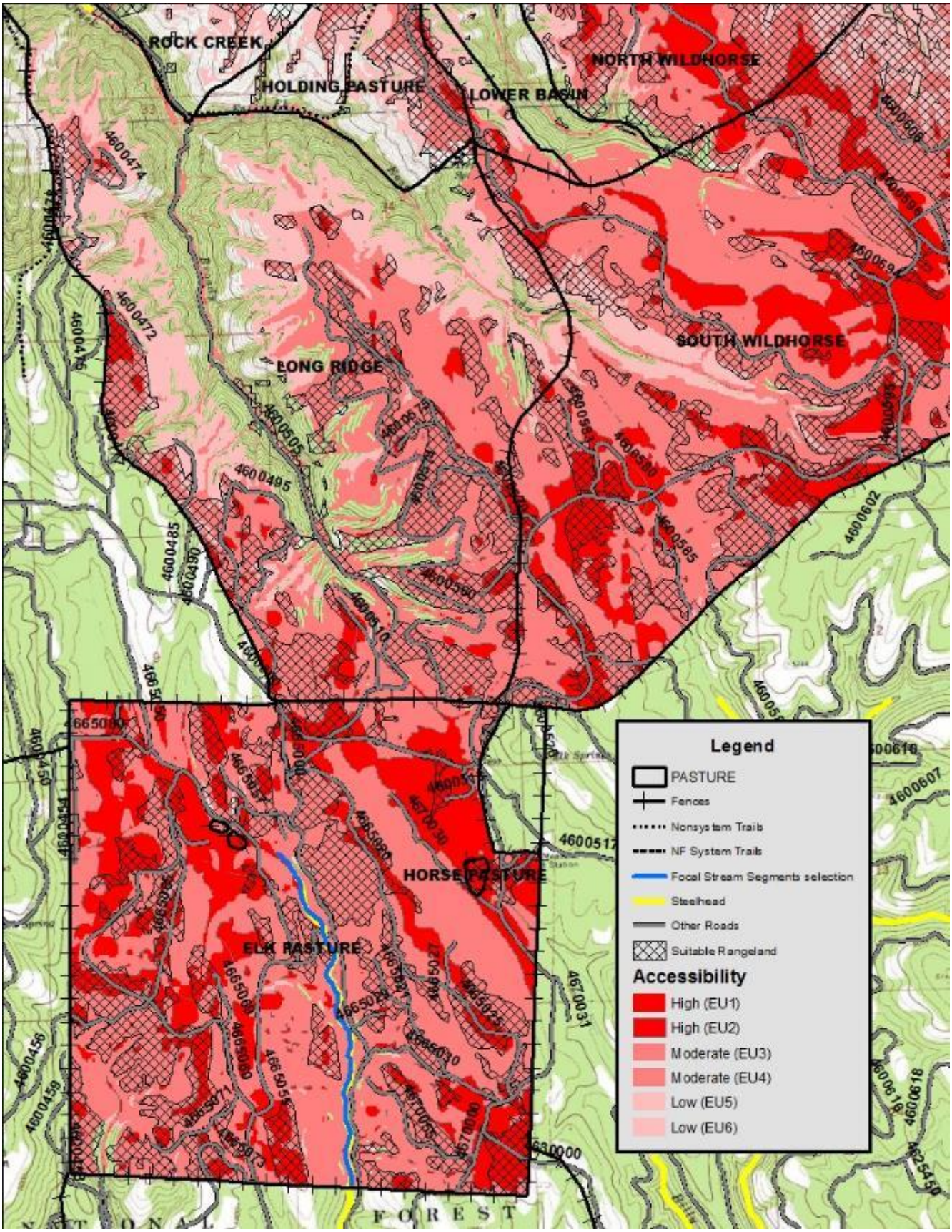

Figure E-1. Accessibility analysis for the Elk pasture, Teepee Elk Allotment

Rock Creek Pasture - Broady Creek

Broady Creek downstream of the confluence with W.F. Broady Creek is likely to be inaccessible to livestock from the adjacent uplands. Slopes are greater than 60%, expected use areas do not extend downslope, and roads/trails area not present that would funnel livestock from upland areas. Broady Creek upstream of the confluence of W.F. Broady Creek may be accessible from the Rattlesnake Ridge uplands. Permittee's herding practices result in little livestock presence along Broady Creek. Field observations indicate that there is very little livestock presence adjacent to Broady Creek. Early season air temperature regimes encourage cattle to stay on ridgetop. No timing restrictions on use of the pasture.

Long Ridge Pasture – Broady Creek

Steelhead spawning and rearing habitat in Broady Creek is restricted to the lower ½ mile in the Long Ridge Pasture. Accessibility is rated as low to this portion of Broady Creek due to the steep hillslopes. Upland water sources are present along Long Ridge. FR4600-505 does run along the length of Broady Creek in the Long Ridge pasture. However, cattle do not appear to access spawning and rearing habitat due to the distance from suitable grazing areas. Focal stream segments were not identified in this reach of Broady Creek. A non-system trail originating at the old cow camp in the Holding pasture does access Broady Creek from E.F. Broady Creek. However, this trail has not been maintained and did not appear to be physically present when visited in 2018. Early season air temperature regimes encourage cattle to stay on ridgetop. No timing restrictions on use of the pasture.

Accessibility Summary

Table E-2. Accessibility ratings for pastures and streams in the Teepee Elk Allotment.

Pasture	Stream	Accessibility Rating	% Focal Stream Segment	Mitigations	Use Period Restriction
Elk	E.F. Peavine Cr	High	100.0	Construct exclosure	After S/E period*
Long Ridge	Broady Cr	Low	0.0	None	None
Rock Creek	Broady Cr	Low	5.1	None	None

*Construction of exclosure would allow for use during the spawning/emergence period.

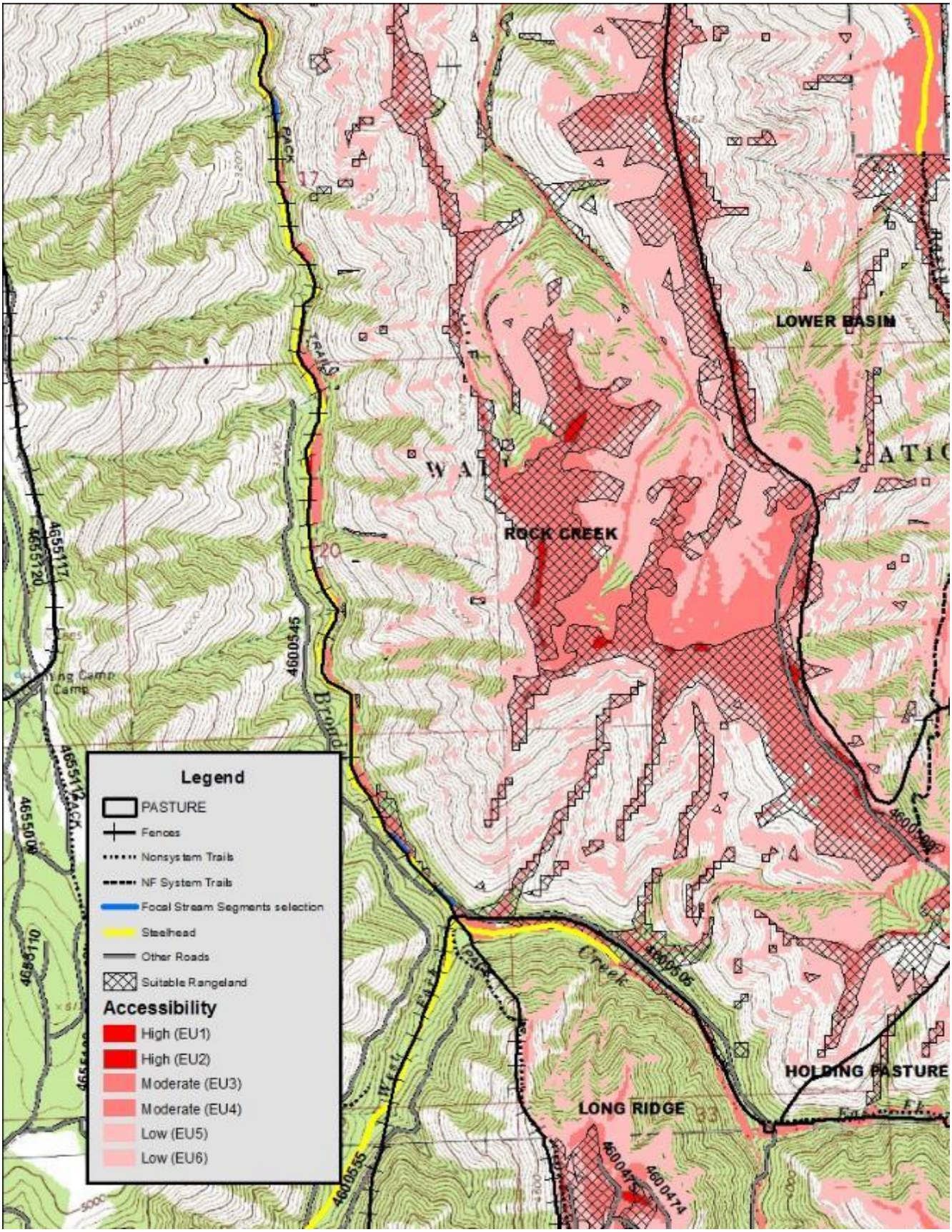

Figure E-2. Accessibility analysis for Rock Creek pasture, Teepee Elk Allotment

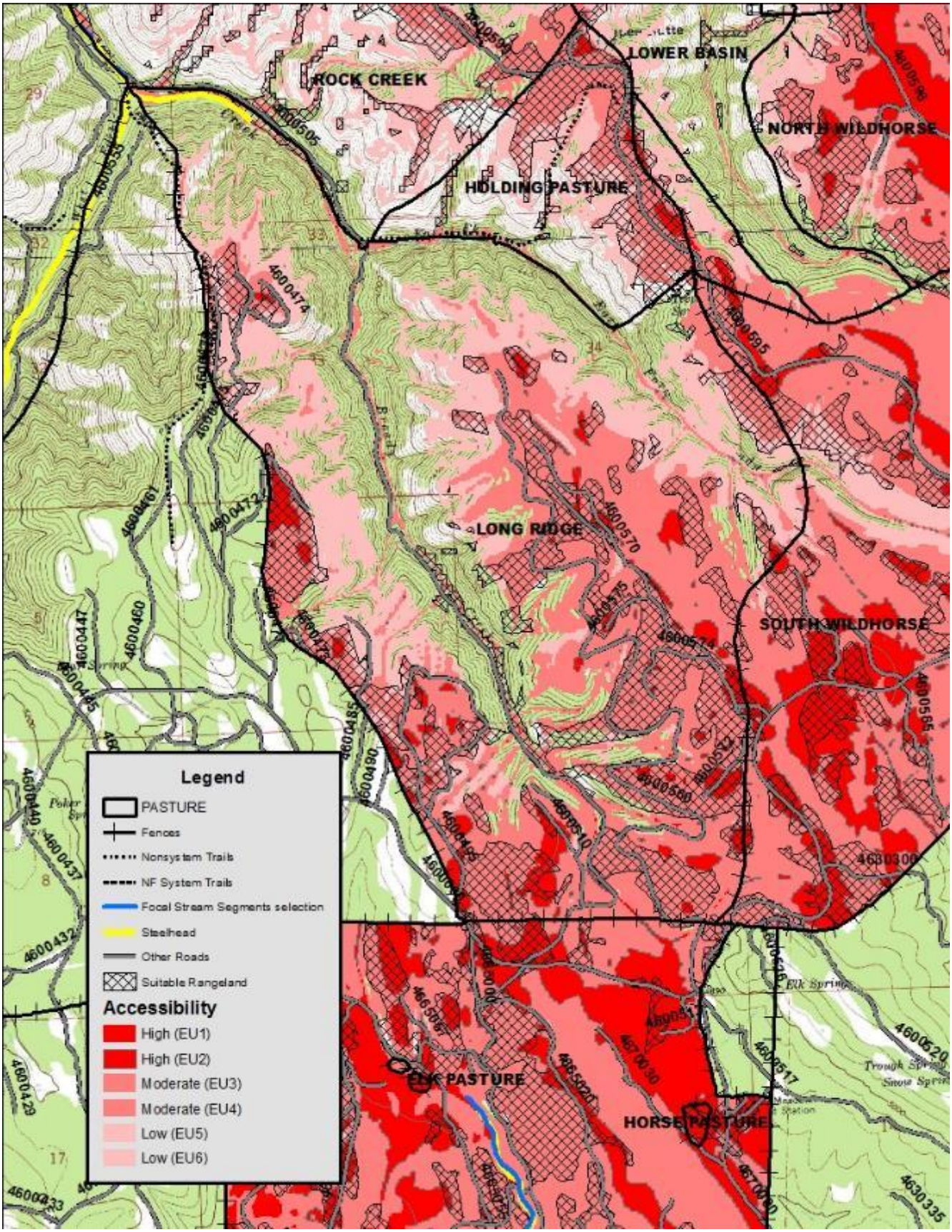

Figure E-3. Accessibility analysis for Long Ridge Pasture, Teepee Elk Allotment

Cold Springs Allotment

Lower Cottonwood Pasture – Cottonwood Creek

Lower Cottonwood Creek in the Lower Cottonwood pasture is in a fairly steep and large canyon. The Lower Cottonwood pasture contains very little ridgetop grazing areas. Cattle have not been present along this portion of the creek during the early summer during past field visits. The majority of ridgetop grazing area within the pasture is located in the southwest corner of the pasture; about 340 acres in size. Cottonwood Creek is rated as low accessibility from this portion of the Lower Cottonwood Pasture. Grazing the rest of the Lower Cottonwood Creek pasture during the spawning and emergence period would be problematic due to the lack of upland water sources.

Numerous pastures are adjacent to the Lower Cottonwood pasture. Cottonwood Creek in the Lower Cottonwood pasture is rated as low accessibility from these adjacent pastures. On the eastside of the Cottonwood Creek canyon are the North Cold Springs, Beef, Cow Camp and Horse pastures. The majority of the boundary between the Lower Cottonwood pasture and these adjacent pastures is not fenced. Upland water sources are available along the eastern ridgetop (Cold Springs Ridge). Early season air temperature regimes encourage cattle to stay on ridgetop. Limited water sources are present at intermediate elevations in the canyon.

Potential access routes from ridgetop grazing areas were identified down Cold Spring Gulch (North Cold Springs pasture), the drainage north of Smooth Gulch (North Cold Springs pasture) and down the FS trail adjacent to Deadhorse Creek (Beef, Cow Camp and Horse pastures). Field visits indicate that the Deadhorse Trail (TR 1708) is an access route to Cottonwood Creek. A drift fence is recommended to be constructed across Deadhorse Creek to prevent cattle from accessing Cottonwood Creek from the Beef, Cow Camp and Horse pastures. No timing restrictions for pasture use along the eastern side of the canyon.

On the westside of the canyon adjacent pastures are Lower Bear, North Wildhorse and South Wildhorse pastures. The boundary between the Lower Cottonwood pasture and these adjacent pastures is not fenced. Based on field visits and the accessibility analysis the accessibility of Cottonwood Creek is rated as low. An NFS trail (#1693) is shown on maps that accesses Cottonwood Creek from Bear Ridge in the Lower Bear pasture. However, this portion of the trail no longer exists on the ground. Early season air temperature regimes encourage cattle to stay on ridgetop. Limited water sources are present at intermediate elevations in the canyon. No timing restrictions for pasture use along the western side of the canyon.

South Wildhorse Pasture – Cottonwood Creek

The South Wildhorse pasture includes portion of Cottonwood Creek. This portion of Cottonwood Creek is shared with the Lower Cottonwood pasture. This reach of Cottonwood Creek is rated a low accessibility from ridgetop grazing areas in the South Wildhorse pasture due to steep slopes, lack of forage, and mid elevation water.

Upper Cottonwood Pasture - Cottonwood Creek

Upper Cottonwood Creek is rated as highly accessible to livestock in the Upper Cottonwood pasture. Ridgetop grazing area is present on the westside of the allotment. However, there are no water sources located in this area. Cattle can access Cottonwood Creek from this ridgetop area by the Howard Cutoff

Trail. There are no ridgetop grazing areas on the eastside of the allotment. Schedule use of the pasture after the spawning/emergence period (> July 1).

Like the Lower Cottonwood pasture, there are pastures adjacent to the Upper Cottonwood pasture with unfenced boundaries. From the South Cold Springs pasture access routes are present along the Howard Cutoff Trail (NS), and a livestock trail down the E.F. Cottonwood Creek. Another access point is north of the Howard Cutoff Trail along a draw entering Cottonwood Creek from the east. During the PFC assessment livestock use was noted where this draw intersects Cottonwood Creek. These access routes are in the vicinity of focal stream segments and are likely steelhead spawning areas based on field visits. To limit access to Cottonwood Creek from the South Cold Springs Allotment drift fencing is recommended to be constructed to prevent cattle from utilizing routes down the Howard Cutoff Trail and the E.F. Cottonwood Creek.

Summary

Table E-3. Accessibility ratings for pastures and streams in the Cold Springs Allotment.

Pasture	Stream	Accessibility Rating	% Focal Stream Segment	Mitigations	Use Period
Lower Cottonwood	Cottonwood Cr	Low	15.4	None	After S/E period
South Wildhorse	Cottonwood Cr	Low		None	No Restrictions
North Cold Springs, Beef, Cow Camp, Horse	Cottonwood Cr	Low	N/P	Construct fencing across the Deadhorse Trail	No Restrictions
Upper Cottonwood	Cottonwood Cr	High	16.2	None	After S/E period
South Cold Springs	Cottonwood Cr	Moderate	N/P	Construct fencing across HC Trail and E.F. Cottonwood Cr	No Restrictions

*Construction of fence would allow for use during the spawning/emergence period.

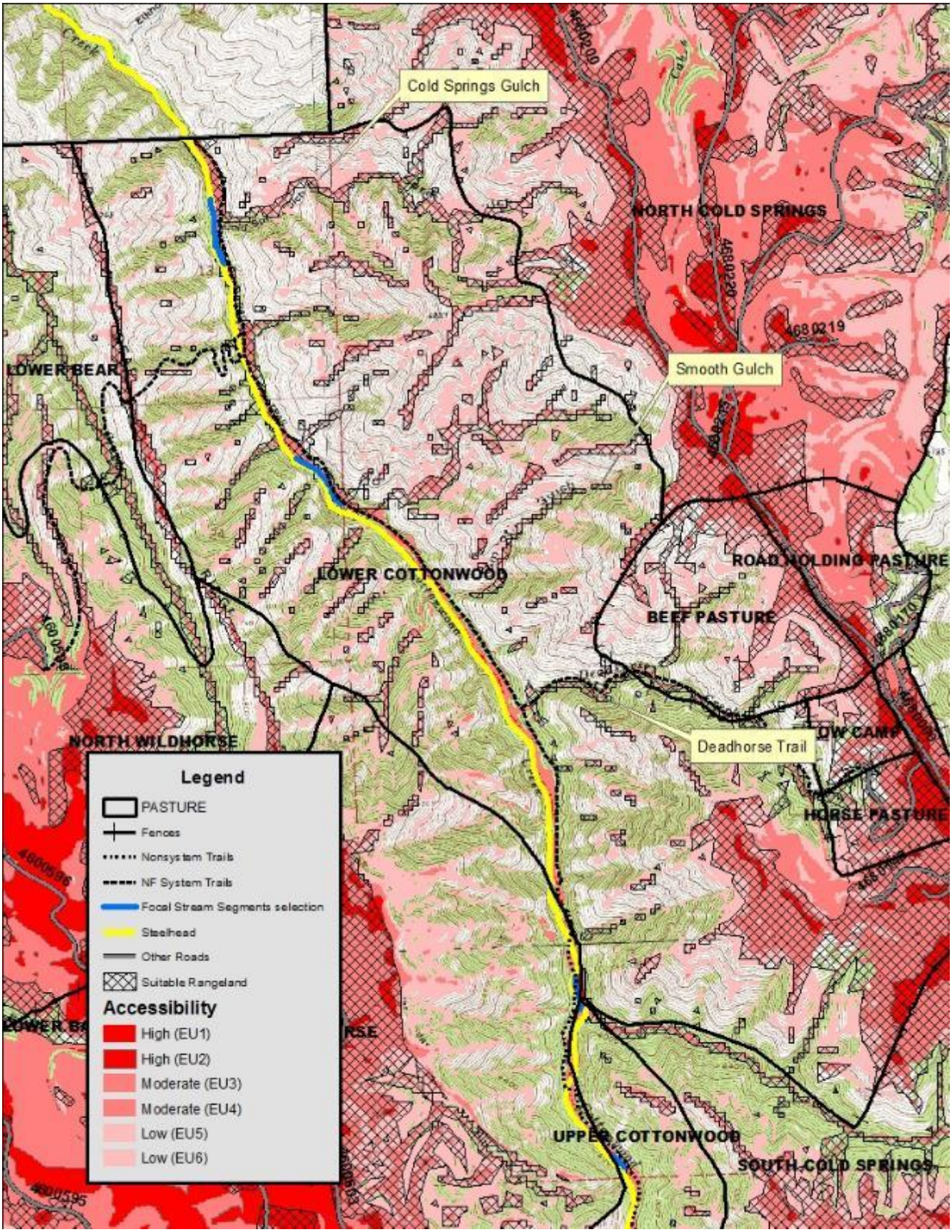

Figure E-4. Accessibility analysis for Lower Cottonwood pasture, Cold Springs Allotment

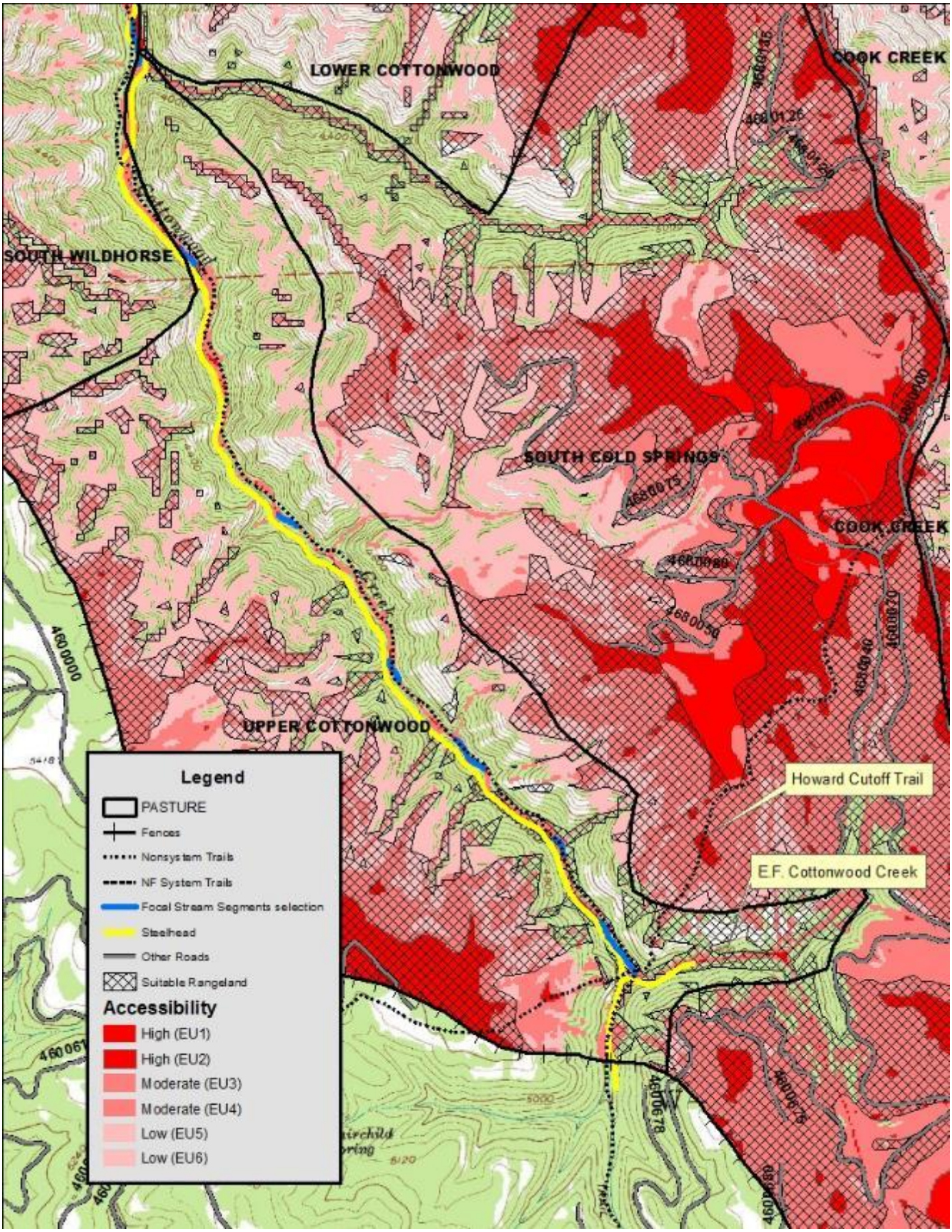

Figure E-5. Accessibility analysis for Upper Cottonwood pasture, Cold Springs Allotment

APPENDIX F – SPAWNING/REARING HABITAT ASSESSMENTS

Ocular assessments for spawning and rearing habitat were conducted on streams where there was doubt of the previously mapped distribution of steelhead in the CERA analysis area. The assessments were conducted by USFS and NPT fish biologists. The areas assessed were generally headwater areas of streams with documented occurrence of steelhead (Figure F-1 and F-2). The biologists used visual indicators of spawning habitat (size and location of suitable substrates), rearing habitat (indicators of stream flow, pool-like features, etc.), and professional judgement to determine the potential for a headwater reach to support spawning and/or rearing. See Table F-1 for a summary of findings.

Table F-1. Summary of potential spawning/rearing habitat assessments.

Allotment	Pasture	Stream	Assessor(s)	Potential Spawning Habitat	Potential Rearing Habitat	Comments
Teepee Elk	Elk	E.F. Peavine Cr	Miller (FS), Frenyea (NPT), Pagano (NPT)	Yes	Yes	Spawning gravels present, rearing limited to early spring due to the lack of flow
Cold Springs	Horse Creek / North Cold Springs	Horse Cr	Miller (FS), Frenyea (NPT), Pagano (NPT)	No	No	
	Lower Basin	Basin Cr	Miller (FS)	No	No	
	Lower Bear	Bear Cr	Miller (FS)	No	No	Bear Creek considered spawning and rearing habitat for the 1998 ESA consultation.
	South Wildhorse	Dougherty Fork of Billy Creek	Miller (FS)	No	No	Follow-up ocular survey for fish presence confirmed lack of potential habitat extending onto the allotment

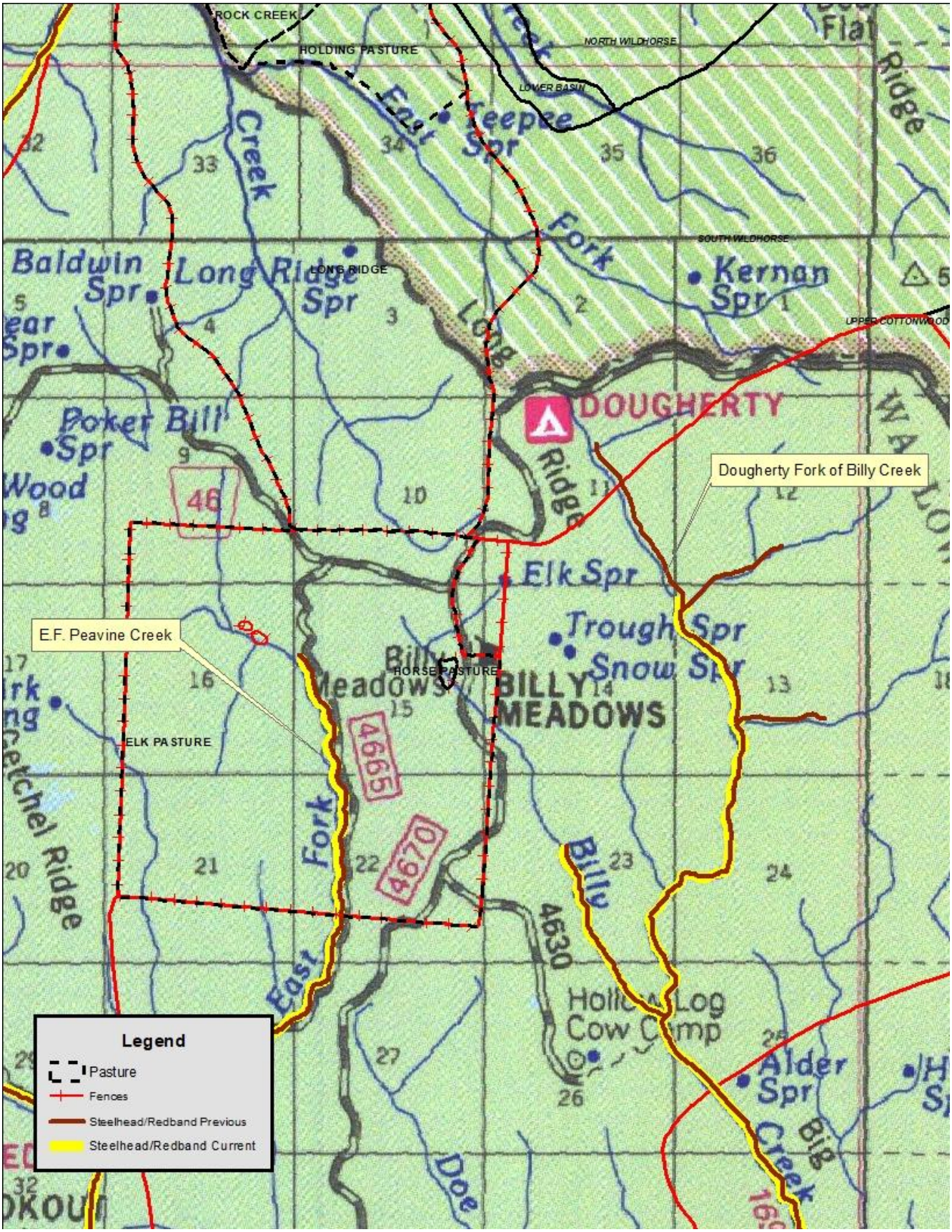

Figure F-1. Current verses previous steelhead distribution: E.F. Peavine creek and Dougherty Fork of Billy Creek.

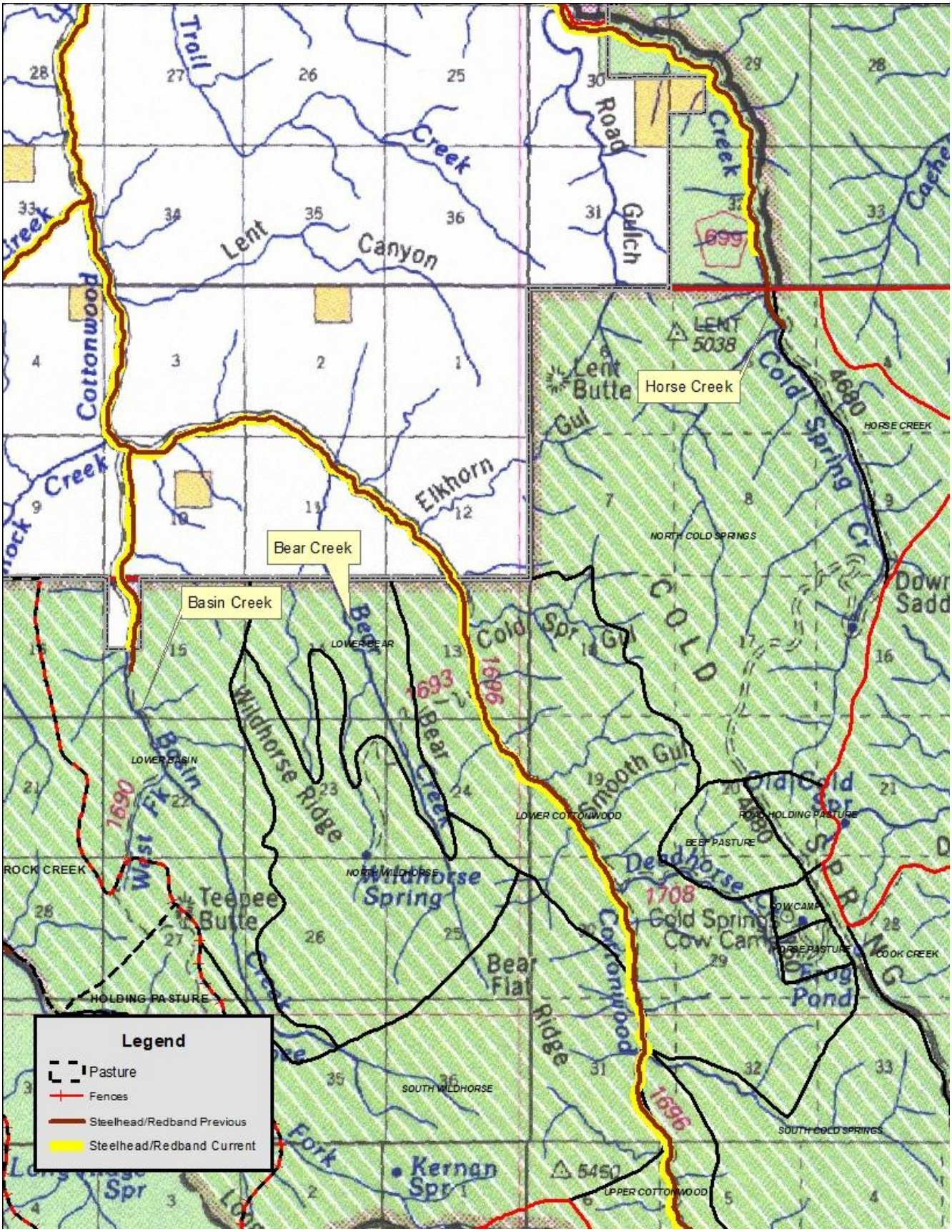

Figure F-2. Current verses previous steelhead distribution: Basin Creek, Bear Creek and Horse Creek.